PHYSICAL THERAPY

The Physiotherapy Review

Vol. X No. 6

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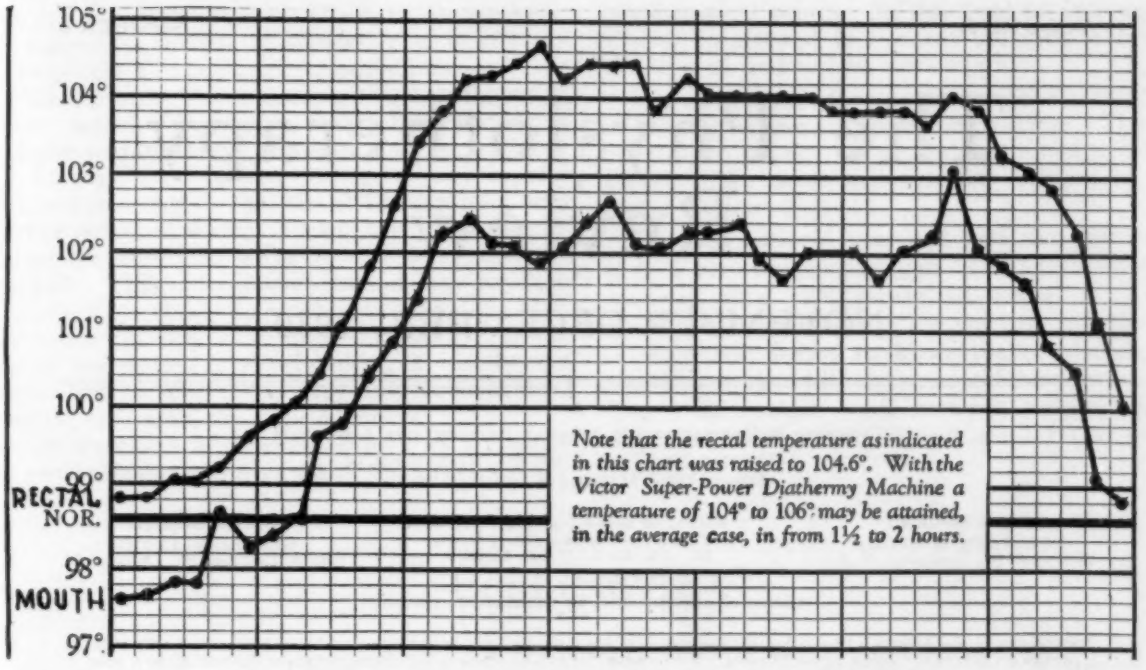

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Psychology of the Crippled Child

By John L. Garvey, M.D., Milwaukee, Wis.

The psychology of the crippled child differs little from that of the normal child in fundamentals. Within the past twenty years considerable has been learned, through psycho-analysis of the adult, to show the effect of impressions and experiences in childhood. It has shown the importance of the formative period of childhood. Consequently within the last ten years special attention has been paid to the mental hygiene of children. Possibly we have gone too far in this direction and have begun to expect more from children than they are capable of giving. After all, we must remember that the physical plant has not been changed very much in this period.

To me it seems rather unfortunate that in our attempt to aid the crippled child we have used terms which so clearly indicate their handicap to the extent that as soon as they are able to realize their situation they find themselves stigmatized. This may work in two ways, depending on their original personality make-up as to the results that are to follow. The child who is so unfortunate to be crippled from an acquired or congenital condition immediately notices that he is unable to keep up with other children. For example, the spastic child notices that he is unable to play the same games, unable to get around as rapidly, and unable to accomplish the same things as his more fortunate brother, sister or playmate. He will choose one of two courses. He will either avoid placing himself in situations where he is called upon to do the same things as other children or he will over-compensate. In the former situation, he is likely to become depressed, unhappy and consequently fall way below the level of his normal capabilities. In the latter case, he is likely to over-compensate, possibly make himself disagreeable to his playmates and others and failing because of his handicap, may resort to unfair and unscrupulous means to attain his end. He finds himself in an intolerable situation. As a result he may find himself in more serious situations, possibly to the point of committing a punishable crime. It is therefore important to recognize in the group of crippled children the fundamental differences as early as possible so that they will not go from one extreme to the other. It is, of course, possibly desirable from the economic standpoint that the child should over-compensate. The crippled child needs guidance, of course, by older people who understand his tendencies. Too much should not be expected from him.

Cooperation should exist between the home, school and workshop for the child is, as a rule, not in a position to judge for himself. A difference in view point may exist between the mother and father and when possible this should be ironed out or balanced.

Not infrequently the crippled child, whether the re-

sult of an acquired or congenital condition, will have in addition some motor or sensory disturbances, a defect in development of higher senses. These may be selective and not very obvious. We note, for example, that a congenital spastic condition is generally regarded as purely a disturbance in motor function. We forget that the same factor causing the disturbance in the motor function may also cause, for example, a defect in the writing center, reading center, or auditory center. It may even be more selective and involve the association center so that the child may be a very good writer but poor reader. Unless this is recognized, because of the ability to write he will be expected to read as well. This unfortunate demand may psychologically affect his ability to write indirectly. No matter how much training in reading this child is given, because of the defect in development, it will be impossible to overcome it. It is very difficult sometimes to recognize defects in the higher centers.

Infantile Paralysis is regarded chiefly as a disturbance in motor function but in many epidemics a varying degree of involvement of the cerebrum occurs leaving its scar in some important brain area resulting in a condition that might be entirely regarded as of psychological origin. In this type of case again it is useless to attempt to develop the faculty because of the lack of material to work upon.

It is unfortunate that we do not have accurate means of testing these various deficiencies. The human mechanism cannot be graded with mathematical accuracy. We must therefore be satisfied to use the means at our disposal.

The occupational therapist and the physi-therapist is in a very unique position. The nature of the work requires, as a rule, individual attention. The child soon gains confidence in the worker, and the worker, if interested, learns to know the peculiarities in the thought of the child and can aid him in many ways. Too often routine work becomes simply mechanical. The adult worker should seek the level of the child's thoughts.

Book Review

Diseases of the Skin. By George Clinton Andrews A. B., M. D., Associate Professor of Dermatology, College of Physicians and Surgeons, Columbia University. 1091 pages with 988 illustrations. Published by W. B. Saunders Co., Philadelphia, 1930.

This is a most complete text book. It is especially valuable for all physiotherapists who are treating skin diseases. There is a chapter on ultraviolet light that considers the sources, physical characteristics, biological action, the technic, dosage and indications.

Surgical diathermy is discussed in another chapter, and descriptions are given of the current, the apparatus, its effects, the operative technic, the indications and the advantages and disadvantages. There are also excellent chapters on roentgen ray therapy supersoft x-ray (Grenz Rays) and radium therapy. At the end of each chapter is a most complete bibliography. These complete chapters on physical agents and their uses in addition to the usual descriptions of the various skin lesions makes this a book of great value to all physiotherapists.

Orthopedic Schools

By Marguerite M. Lison, Director, Crippled Children's Division, State Department of Public Instruction in Wisconsin

In August, 1927, the Wisconsin law providing for special facilities for the education of the blind, deaf, and the exceptional child was amended to include special facilities for the education of the crippled child. The policies established for the administration of this law recognized that the major portion of the need for special facilities for crippled children was that of trained supervision of their physical care.

It was found after careful study that a city of 25,000 or more population with a thickly populated rural district surrounding it, had enough physically handicapped children to warrant the establishment of a special class. Since the passage of this law, seven cities in Wisconsin have established orthopedic schools for crippled children. Of these cities, Milwaukee has a population of over a half million, but the other six cities range in population from 25,000 to 50,000. Many of the cities had difficulty in finding suitable quarters for these special classes. One city built a special building and other cities reconstructed parts of regular school buildings.

Before any steps are taken to establish such a school, a census of crippled children followed by a careful survey is conducted in the county. The county is taken as a unit of study rather than the city. The census is made by the schools, and by health and social agencies. Someone from the Crippled Children's Division of the State Department of Public Instruction then conducts a survey, using as a basis, the information of the census.

An orthopedic clinic under the auspices of the county medical society and the Wisconsin Association for the Disabled follows the survey. A complete report containing the findings of the survey and the clinic is then made to the city board of education with recommendations that special classes be organized for a definite number of crippled children.

State aid is granted to cities establishing such classes in order to reimburse them for the excess costs. Cities pay toward this work what it would cost to educate an equal number of normal children in regular schools. This is estimated at $70 a year per child. A maximum amount of $300 a year per child is granted as state aid to cover the excess costs.

These orthopedic schools have also been conducting summer sessions in order that the physiotherapy treatments be continued through eleven months of the year. The state aid has been sufficient to cover also the added cost of the summer session.

In these schools, the attempt has been made to have the best academic teachers possible. The children are expected to keep up to grade and they do. Many of the children when first enrolled are retarded because of long abscences during hospital treatment or during illnesses. Every effort is made to give them individual attention in order to make up the lost time.

Each child enrolled in the school is there on the recommendation of a physician. A physiotherapist is employed to have supervision of the physical care of these children. Any treatments which are given by that physiotherapist are on the recommendation of each child's physician.

The young women who are employed in these positions are usually graduates of physical education courses of university grade, and have had post graduate courses in physiotherapy. Following this training, two or more years' experience in crippled children hospitals, is required. Those employed as assistant physiotherapists have sometimes had less experience, but the same amount of training is required.

The physiotherapy departments in these orthopedic schools are fairly well equipped. Infra-red and ultra-violet lamps, massage tables, stall bars, head supension apparatus, walking apparatus, full length mirror, and other equipment are furnished. In some of the larger schools where space permits, hydrotherapy tanks have been installed.

The children are transported by busses or other means, from their home to the school. As far as possible all stairs are eliminated in the rooms set aside for the special classes and ramps are installed. Railings are placed along the hallways and around the classrooms to aid the child with braces to get about more easily. Cots are furnished so that they may rest during the day. Frequently, the cardiac cases receive two rest periods a day. Luncheon is served the children at noon, and milk is also served them during the morning session. In one school, about one-third of the children are served breakfast, since they come from homes not able to furnish wholesome food.

These orthopedic schools in the smaller cities especially, have become the real center for all the work in connection with the disabled. Crippled children of pre-school age are brought in to physiotherapist for assistance in regard to muscle training. Arrangements are made for older boys and girls, who need physiotherapy treatment, and who are enrolled in high schools and vocational schools, to come two or three times a week, or daily, if necessary, to the orthopedic school.

A physiotherapist in an orthopedic school located in a small city is usually the only one in that community who has had specialized training. She is in the position more or less of a pioneer who not only must carry on the actual work, but also must educate the community as to the needs of crippled children. The work of the physiotherapist in most of the orthopedic schools also requires organizing ability. Usually, through the physiotherapy department are made all contacts for the crippled child with the doctor, the hospital, the clinics, the health, and the social agencies.

In a few years as the appropriation for this work is increased, there will be established orthopedic schools in at least the fourteen cities in the state having over 25,000 population. Under the present law, it is possible for crippled children living in small towns and rural sections and needing therapeutic treatment to attend the orthopedic school. A maximum allowance of $150 a year is granted to cover the cost of maintenance for such cases who must live away from home. Most of these children boarding in town and attending

the orthopedic schools go home over the week-end. If it is found that orthopedic schools in the larger cities are not sufficient to meet the needs of these crippled children living in small towns and rural sections, then later, Wisconsin may establish more of these special classes in even smaller cities.

Many states are just beginning to realize that very scientific and systematic follow-up care can be provided crippled children through the regular school system, and that such supervision is a responsibility that can no longer be delayed. The progress in the development of this program throughout the United States will depend largely on the number of physiotherapists prepared to undertake the work.

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The Results of Carbon Arc Light Treatment of Intestinal

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Diagnosis and Treatment of Postural Deformities of the Spine

By DeForest P. Willard, M.D., Philadelphia, Pa.

Read before the Section on Surgery of the Medical Society of the State of Pennsylvania, Erie Session, October 1, 1929.
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Only the physical disabilities caused by faulty posture of the spine in adults come within the scope of this paper, and of all the ailments to which the human body is heir, not one causes so much bodily inefficiency and discomfort as poor posture. This condition is not a disease, although it may result from or predispose to or accompany disease. Poor posture is primarily the result of our inability to use efficiently, in our present erect position and with our sedentary habits of life, a motor mechanism which was originally planned for the horizonal position of the four-footed animals. We are quadrupeds set on end. In the horizontal position the spine and its ligaments would support the body well, but in the erect posture the curved, flexible spinal column can be held correctly only by the pull of the elastic muscles. Because of this flexibility of the spine and its supports our body can readily be placed temporarily in almost any position and as readily be brought back to normal; but if these abnormal positions are persisted in, so that the supporting muscles become overstretched and weakened, and the ability to return to normal be, therefore, lost, then faulty posture with its resultant train of symptoms may be said to have become established.

To know poor posture when we see it, we must be able to understand good posture. No hard and fast definition can be made for every type of individual. We may say, however, that in good posture the body weight is carried well forward on the balls of the feet, the legs are straight, the pelvis is held back at an angle of 50 to 60 degrees to the horizontal, the abdomen is retracted, the chest elevated, with the shoulders flat and the head held erect. This position brings the line of balance of the body at the front of the astragalus and through the anterior knee-joint. At the hip it passes just posterior to the hip-joint and just anterior to the sacro-iliac axis. It crosses the bodies of the vertebra at the dorsolumbar junction and again at the cervicodorsal junction to the mastoid process.

To give the maximum bodily efficiency the back must be flexible, and for this reason our spinal column must be curved in at least one plane. These curves occur normally in the anteroposterior plane without any lateral deviation. The curves are forward in the cervical, backward in the dorsal, forward in the lumbar, and backward in the sacral region. To insure the minimal amount of muscle strain in holding this curved column, these curves in the normal adult should show a variation from the straight line of only about one inch anteriorly in the lumbar and about two inches posteriorly in the dorsal region. Poor posture consists in any persistent exaggeration of these anterior-posterior curves or any lateral curvature.

By far the greatest number of postural defects consist in the persistent exaggeration of one or more of the normal anterior-posterior spinal curves. These defects usually begin in childhood or adolescence but are very common in adults, especially in women, either as a primary or as a residual defect. In the examination of these cases a clear picture of the defect can be obtained only by exposure of the whole body. By far the most usual type is the increase in the anterior lumbar curve and the posterior thoracic curve. This combination is usually known as *sway back* and *round shoulders*. Either of the two curves may predominate, but are usually found together. With these occurs an increased forward tilt of the sacrum, the pedestal on which the flexible spine rests. In certain individuals, the normal curvatures, especially of the lumbar region, may be decreased or flattened and this may be accompanied by some degree of forward bending of the dorsal spine. A third type (the so-called *flat back)* is a sharp forward angulation of the low lumbar spine with hyperextension of the upper lumbar and flattening of the dorsal spine. Any of these abnormalities of the main weight-bearing system throws the whole organism out of adjustment, and widespread, and often severe derangements of the other bodily organs and systems appear, which are basically due to the spinal changes.

The causes of the static deformities are very varied, but primarily they depend on loss of muscle tone of the main supporting muscular groups—the extensors of the hips and the extensors of the back. This loss of muscle tone may be due to acute illnesses, prolonged mental or physical fatigue, or poor hygiene. Bad habits in standing or sitting, caused by occupation, are also a distinct etiologic factor. Poor posture may be secondarily caused by disease of the spine, as in arthritis, or in the muscles themselves, as in infantile paralysis, and adds its symptoms to those of the primary disease.

In the clinical study of these conditions, we must take into consideration the variations in anatomic structure of the body. The most casual observer should realize that human anatomy varies tremendously, but all the variations can be grouped into three general classes. According to Goldthwait, who is unquestionably the pioneer in emphasizing the importance of postural spinal defects, the three main, physiologic types of back are: (1) the normal with medium height, well-rounded thorax, high diaphragm, flat lower abdomen, and well drawn back shoulders; (2) the long back type with light bony structures, flat narrow chest, unusually long lumbar spine, and increased flexibility of the whole body; (3) the broad back, heavy type, with large, short skeleton, excessive fat throughout the body, short neck, large wide chest, deep abdomen, and short lumbar region.

The postural defects vary in these different types. In the normal, the forward and downward dragging shoulders, with relaxed abdomen and lumbar lordosis are most usually seen. In the long back type, the above malposition, or the flat-back type, are most com-

mon, while in the heavy type, moderate lordosis, with rounded dorsal spine is predominate. In these varied malpositions of the spine, examination will show that there is no permanent spinal deformity. In the prone position, or even in the erect position, voluntary correction is possible. Spinal motions are free and unrestricted, except for the relatively mild limitation of motion when the muscle pain is severe.

In addition to these objective signs of malposition, there are usually added many subjective symptoms, caused either primarily by the static defects of the spine or secondarily by the dysfunction of the other bodily organs from which the patient seeks relief. It should be remembered that the thoracic cage and the abdominal cavity change their shape with every spinal motion and that any prolonged spinal abnormality must cause secondary changes in these areas which markedly affect the organs contained in them.

In the back itself pain is the most persistent symptom. This occurs over the muscle areas adjacent to the spine rather than on the spinous processes. It may center in the upper muscular attachments in the neck, or more commonly in the lumbar muscles and in their attachments on the sacral and sacro-iliac region. The most characteristic point is that the pain is increased by prolonged weight-bearing and is decreased by rest. Tenderness is usually found in the painful areas, but is relatively mild compared to the degree of pain. In addition to this pain which is due to the overstrain of the muscles and ligaments, we usually find more or less radiating pain along the posterior sensory nerve tracts. The intercostal and lumbar nerves either on one side or both show marked pain and tenderness in this distribution. Acute pain in the lateral and anterior chest wall from this source may often cause a mistaken diagnosis of inflammatory lesions of the chest, but the absence of intrathoracic signs should clear the diagnosis. Carnett has drawn attention to the pain and tenderness of the lateral and anterior abdominal walls which again have been so often diagnosed as a sign of intra-abdominal disturbance. Careful examination will localize posterior root pain as a condition of the abdominal wall and not of the abdominal cavity.

Irritation of the lower lumbar nerves may cause radiating pains through the genital regions and the areas supplied by the sciatic nerves. The marked relationship, however, between pain and prolonged weight-bearing together with the objective signs of bad posture offers at least a clue to the correct diagnosis.

The flattening of the chest and the interference with thoracic contents will often cause symptoms of shortness of breath, cardiac pain, etc., which must be carefully distinguished from organic disturbances of these organs. The lessening of the costal angle, the loss of tone of the anterior abdominal muscles, and the resultant pendulous lower abdomen greatly favor the occurrence of visceroptosis, and this condition adds its symptoms of gastric and intestinal disturbance.

In the treatment of these conditions it is necessary to consider not only the posture of the back but all the associated conditions that go with it. Bad posture is not a purely spinal defect, it involves the whole motor mechanism of the body. The circulatory and respiratory systems, the gastro-intestinal and genito-urinary tracts are all affected, and in the planning of individual treatment each portion must receive due consideration.

It is obvious that all general measures that promote good muscle tone, normal circulation, and good digestion are of value. Tonics, out-door exercise, heliotherapy, and good hygiene are general aids in treatment; but specifically our problem is to build up the muscular supports of the body so that good posture may be attained and retained. In all cases the basic causes of muscle weakness should be sought for and corrected. Bad habits of posture from whatever cause should be eliminated. In the more severe cases, it is often necessary to give the overtired muscles a chance to rest and relax before the building-up process is started. Absolute rest in bed for days, often weeks, is necessary to relieve the pain and muscle spasm. In some cases the correct alignment of the spine and thoracic and abdominal viscera can be obtained only by the application of a posterior plaster shell or bed, extending from head to thighs. As the muscles assume more normal tone, stimulation by heat and massage adds to the rapidity of recovery. At the same time voluntary muscle training in the prone position to teach correct habits of posture can be started.

In the milder cases, or after the bed treatment, corrective braces or corsets, to hold the body while in the erect position and to relieve the still weakened muscles from overstrain, can be successfully used. These braces may vary greatly, but basically are planned to give a firm back support from pelvis to lower ribs with a belt around the lower abdomen to correct the lumbar curves and improve body balance. In some cases an upper extension of the brace to hold the thorax and shoulder girdle in position may be necessary. These braces in themselves often overcome the major symptoms of pain and digestive disturbances, but they do not overcome the underlying muscular faults, and, therefore, must be considered only as an episode and not as the whole treatment.

By far the most important treatment is voluntary muscle exercise which must be continued until correct posture becomes habitual. Exercises should not only build up the necessary muscle structures but also rid the patient of bad postural habits and teach correct posture. These exercises should be done at first under the direction of an especially trained gymnastic teacher who can guide the patient both as to the type and the amount of exercise needed. When the routine of exercise has become fully established, then the patient may carry out the program in the home, returning occasionally for supervision by physician and physical therapist. The amount and type of exercise vary so considerably with each patient that it is impossible in a short paper to cover the details of this part of the treatment. It can only be said that these muscular exercises aim to strengthen mainly the muscles of the respiration, the anterior abdominal muscles, and the extensors of the back and thighs. The full coöperation of the patient is absolutely necessary. He should be made to realize that only by prolonged exertion on his part, can cure be obtained. Bad posture is not one of those human defects that can be placed entirely in the doctor's hands. One cannot leave one's motor mechanism at a doctor's office as at a garage, and have it put in first class condition while one waits. The doctor and the physical trainer are of immense help, but only through complete teamwork between patient, physician, and physical therapist can full results be obtained.

Lateral deviation or scoliosis is a postural defect that has its origin in a vast majority of cases in childhood or adolescence, and is seen in adults only as a residual deformity, or as a secondary symptom of disease or injury. Two main types are seen: (1)

postural; and (2) structural. The first type, postural, appears as a single curve to one side or the other of the whole spine, without rotation of the vetebra. The curve can be forcibly corrected and there is no deformity of the thorax. In addition to the curve, the most noticeable objective signs are inequality of the shoulders, the shoulder on the convex side being high, prominence of the hip on the concave side and increased space between the body and the pendent arm on the concave side. There are usually no subjective symptoms, and for this reason this type of curve may remain undiagnosed and untreated until the deformity becomes very severe. The causal factors are usually poor muscular tone plus unilateral skeletal defects, such as short leg or dislocated hip, irregularity of vetebral growth, empyema, disease of the bone such as rickets, or diseases of the muscles, such as infantile paralysis. Many cases have no obvious underlying physical defect and are caused by prolonged bad habits of posture assumed either at home or as a part of the patient's occupation.

The second type, structural, usually appears as a double or even triple curve of the spine. It is the secondary stage of postural curvature in which the deviation becomes fixed and cannot be entirely corrected by manipulation. The vertebral bodies become deformed, becoming wedge-shaped in the anteroposterior view. The vetebræ also rotate, and this deformity causes a backward displacement of the ribs on the convex side with marked prominence of the scapula overlying the ribs. The causes of structural scoliosis are practically the same as those of the postural type.

The treatment of the first group consists in removal, whenever possible, of the etiologic factor, in the application of some form of brace or stiff corset to hold the body in the correct position and in long continued gymnastics to strengthen the muscle supports of the spine, especially those on the convex side of the curve. The exercises are preferably given under the supervision of a trained physical therapist and continued until the muscles adequately hold the spine in the correct position.

The same treatment holds good for the milder structural cases, but, in addition, the stiff, unyielding curvatures must be forced back towards the normal by the pressure of properly applied plaster casts or by lateral traction in the recumbent position. The more severe types of structural curvature with marked rib deformity offer little hope of cure. Increase in the deformity can be prevented by proper bracing or by operative fusion of the spine. Cosmetically, the deformity of the thorax can be improved in certain cases by section of the deformed ribs. Unfortunately structural scoliosis can practically never be entirely corrected, although the postural type offers a good prognosis if treatment is thoroughly carried out.

The care of these patients is a responsibility that the orthopedic surgeon must assume, but the diagnosis in the vast majority of cases must be made by the family physician and the responsibility of recognizing these cases in the early or postural stage, when treatment offers a good chance of functional cure, depends absolutely upon him.

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Treatment of Anterior Poliomyelitis

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No claim is laid to much that is original in these pages, but an attempt has been made to combine the knowledge gained in my private practice and the clinics of the Children's Hospital with the more recent findings of men in this country and abroad, as expressed in the latest literature. A clear discussion of the treatment of any disease is always aided by refreshing our minds as to the pathology, symptoms, and etiology, of the disease under discussion. With this in mind, a brief review will be made touching on the high points in anterior poliomyelitis.

Anterior poliomyelitis, or infantile paralysis, is an acute infectious disease, accompanied, in a majority of cases, by paralysis. The paralysis is incidental and not essential, and may be a weakening or total loss of motor power in certain muscles and groups of muscles, with little or no gross disturbance of sensation. It may be, and often is, widely scattered as to the muscles affected, and is primarily a flaccid paralysis, with reflexes lost or lowered.

Pathology. According to Jones and Lovett, "Infantile paralysis is a general infection, the results of which are most marked in the nervous system, in which at autopsy the meninges are found to be edematous and injected, a slight increase in the amount of cerebrospinal fluid also being present. The brain and cord are edematous, and minute hemorrhages can generally be distinguished.

"The first stage in the pathological process is an acute interstitial meningitis, usually most marked on the anterior surface of the spinal cord. In the cord itself there occurs a hyperemia, and a collection of small round cells in the lymph spaces surrounding the vessels (perivascular infiltration) as a result of which in many places the cells are so numerous that they press on the lumen of the vessels and obstruct the circulation. Minute or extensive hemorrhages occur, and there is extensive edema. The lumbar enlargement of the cord is most often affected, and the anterior horns more often than the posterior or the white matter, as in the former blood supply is more abundant. Although the process by which the vascular lesions affect the nerve cells is in large measure a mechanical one, it is impossible to exclude the fact that the virus may exert some directly toxic action on these cells. The damaging effects, therefore, are to be attributed (1) to direct pressure on the nerve cells by hemorrhages, edema and exudate, (2) to the anemia following the constriction of the blood vessels, which is probably the most general and important change, and (3) perhaps to a direct toxic action of the virus itself on the nerve cells. On account of this pressure and anemia, the nerve cells may degenerate, yet if the exudate or hemorrhage, or both, are absorbed soon enough the cells may recover function; on the other hand, if the unfavorable conditions have been over-prolonged or excessive, the changes in the nerve cells may go on to complete degeneration. In addition to changes in the spinal cord, it is very important to note that the same sequence of changes are found to a less degree in the brain, medulla, and pons. The posterior root ganglia are practically always involved by lesions similar to those in the cord itself, and in experimental pathology this is the first step in the process. The terminal stage in the pathological changes is represented by the replacement of the motor cells by focal glioses (focal scleroses), due to increase of neuroglia tissue, which are analogous to fibroses and areas of scar tissue in other organs, due to increase of connective tissue. Shrinking occurs in severe cases. The destruction of spinal cells in any center naturally represents a loss of function of those cells, but the inter-communications between the bundles of motor cells and the connections between muscles and the motor centers are so free and so manifold that, unless the destruction has been very extensive, the possibility remains of establishing new connections between other cells and muscles. This fact serves as a basis for muscle training.

"The changes which are found in other organs in severe infantile paralysis are less striking than those in the nervous system, but are practically as constant, and constitute an extensive involvement of the lymphoid tissue and of parenchymatous organs. In the latter, cloudy swellings are usually met with, not unlike those of typhoid fever.

"In short, it must be remembered that poliomyelitis is a general toxemic process which affects organs throughout the body, but which apparently acts mildly; on the other hand, it is characterized by lesions in the spinal cord which occasionally prove fatal by involvement of the nerve cells controlling respiration or these changes may lead to greater or lesser impairment of motor function in certain of the cells controlling muscular action, most often in the legs. The general tendency toward spontaneous repair in this disease is explained by the pathology, which also shows why partial paralysis is so much more common than total.

"The paralysis at first presents the same appearance, from whichever of the causes mentioned it arises, and may be total or partial. The mildest paralytic changes result from anemia and edema, many of which clear up entirely and all improve except where these causes have led to necrosis. Hemorrhage causes a more serious grade of motor involvement, but if it has caused only pressure on the cells, and not destruction, recovery may occur. Destruction of motor cells by anemia, hemorrhage, or direct action of the toxin, causes some degree of permanent loss of power in the parts supplied by them."

Symptoms. In mentioning the symptoms no attempt will be made to go into details as to the various types of poliomyelitis, as classified by Wickman and others, except to enumerate these various types. The usual symptoms, as we see the disease, will be gone into a little more fully. Emphasis will be laid on systematic examinations and accurate recording of the objective symptoms, especially the muscle groups involved. Wickman's classification is as follows:

1. Ordinary spinal paralysis, anterior poliomyelitis.
2. Progressive paralysis, usually ascending, less often descending, Landry's paralysis.
3. Bulbar paralysis, polio-encephalitis of pons.

4. Acute encephalitis, giving spastic monoplegia or hemiplegia.
5. Ataxic type.
6. Meningitic type.
7. Polyneuritic (multiple neuritis) type.
8. Abortive type.

Aside from Class 1, the ordinary spinal paralysis, which is anterior poliomyelitis we commonly see in children, I wish to lay special stress on the last type, and say that I believe many individuals, both children and adults, have the so-called abortive type, or possibly a better term would be a mild type without much paralysis and these cases are never diagnosed. There is no question but that many of the so-called encephalitic cases can be classed as acute poliomyelitis.

It is remarkable in how many cases, with deformities of more or less severity, it is impossible to fix a definite date as to the onset of the disease. Sometimes the symptoms of the acute stage are so mild as to be entirely overlooked, and the weakening and paralysis are the first symptoms noted. This difficulty in definitely fixing the date of the onset of the disease is not confined to children of ignorant parents with large families, where acute spells of short duration may be ordinarily overlooked, but is encountered in families of fairly intelligent parents.

There are generally recognized four stages in the symptomatology:

1. The stage of onset.
2. Stationary period.
3. Partical recovery or convalescent stage.
4. Chronic stage.

Aside from the usual symptoms noted in all infectious diseases that vary with the intensity of the infection, symptoms that in many cases lead to diagnosis of rheumatism, influenza, meningitis, and at times even acute osteomyelitis, Platt, of England, calls attenton to and lays emphasis on three important symptoms:

1. Stiffness in the neck.
2. Spontaneous pain in the back and limbs.
3. Marked tenderness of the limbs.

Albee calls attention to a skin rash resembling at times measles or scarlatina, purpuric and herpetic in character, that may be mistaken for one of the exanthemata. I have seen this skin condition in several recent cases. Paralysis comes on early in the disease. In many instances it is the first symptom noted by the mother. The reflexes are lost, although very early, and before paralysis ensues, the knee jerks may be exaggerated and later lost when paralysis begins. The paralysis is a flaccid one involving one or more muscles or groups of muscles of the extremities, and the spinal and abdominal groups. Whitman has noted, and it bears out what we find in clinics here, that the lower extremities are more often involved. His tabulation of the distribution is as follows:

One leg	1,120
Both legs	645
One arm	162
Both arms	33
Leg and arm	222
Three extremities	42
All extremities	194

In the Whitman group the upper arm is more often involved, with persistent paralysis, than the lower, the anterior muscles of the thighs and legs more often than the posterior muscles, and the adductor muscles of the feet more often than the abductor muscles. This fact also bears out my observation of chronic cases seen with hip and knee contractures, and foot held in equinovalgus.

As the acute symptoms of the disease subside, the stationary period comes on, in which the most noteworthy clinical factor is the disappearance of pain and tenderness, leaving only the paralysis.

The convalescent stage lasts an indefinite period, say from one to six months, or longer. Much of the paralysis during this stage gradually clears up as the congestion and mechanical pressure in the cord disappear, leaving only those muscles paralyzed which are affected by actual cell destruction.

The chronic stage may safely be said to begin if, after two years from the initial attack and after intelligent treatment during the preceding stages, the case presents paralysis of certain muscles or groups of muscles. In this stage, especially in neglected cases, we find the deformities and loss of function. I may say here that one of the objects of this paper is to emphasize the observation of these cases, and the importance of early, intelligent, and persistent instigation of proper treatment to prevent these deformities in the later stages.

The causes of deformity are:

a. Force of gravity.
b. Loss of muscle balance.
c. Habitual posture.
d. Functional use.

Most of these factors combine to produce the deformities, but loss of muscle balance is probably the most important factor.

Examination. These patients should be examined without clothing, and the various muscles involved in the paralysis should be noted and recorded. Lovett lays stress on the gait as important in reaching anatomical diagnosis, and we have found this a valuable aid in arriving at a definite idea as to the cause of the limp in the lower limb paralysis. Walking of course can only be employed in those cases that have advanced beyond the acute stage and are in the convalescent period, and then only in cases with some active muscles still present. Too much stress cannot be placed on the nude examination. Much of importance is picked up in this way by observation. Lumbar and abdominal paralysis, and paralysis of the upper arm, which have been previously overlooked in superficial examinations of the extremities, are often thus detected. After noting the limp, and arriving at a definite conclusion, it is a good rule to examine, in order, the upper extremities, beginning with the hand, the elbow, the shoulder, the back, the chest, and abdomen, for signs of paralysis and weakness, then passing on to the hip, knee, ankle and toes. It is not essential to work out the separate muscles, and a very clear idea can be obtained by simply noting the various groups involved, the flexors, extensors, adductors, and abductors of the paralyzed joints, first testing without resistance and then with slight resistance. A full record of these findings is of great help in following out cases through improvement and cure, and also in arriving at definite conclusions as to surgical measures which may be needed to stabilize or improve function.

Treatment may be divided into that for:

1. Acute state.
2. Prevention of deformity during convalescence.
3. Surgical procedure in chronic stage.

In the acute stage opportunity for early treatment depends, of course, on prompt diagnosis. The principle on which treatment must be based will be determined by a clear understanding of the factors causing the deformities. Lovett cautions against "too much treatment," meaning by this that too early or too vigorous massage is counter-indicated in the early stage. This, I think, we all agree to. I do feel though that we can

lay down no hard and fast rule as to the time when massage should be started, or how often it should be given. Each case should be considered individually. As soon as diagnosis is made, these patients should be put at complete rest to protect the inflamed nerve cells from every form of peripheral stimulus. For this purpose we may use the plaster bed or the Bradford frame. The limbs should be immobilized in certain positions we will note, which will prevent the occurrence of the common contractures. For instance, the thigh should be extended, the leg extended on the thigh, the foot held at right angle, with neither pronation nor supination of the foot. The upper extremities should be kept at rest in abduction, not allowing the weight of the arms to pull on the shoulder. These points are important because the fixed deformities often begin within a few weeks of the onset of the disease. A little later, when the acute symptoms of the disease have subsided, we may begin to tell more definitely the muscles involved in the paralysis. These paralyzed muscles should be put in a position of relaxation. By relaxing the tendons of the paralyzed muscles, we are forestalling early loss of muscle balance, and can thus prevent in a great measure the unopposed muscle pull, which is the main cause of the deformities. For example, we many times see children with the tibial group apparently paralyzed and the foot held in marked valgus deformity. If the case has been untreated, it is difficult to tell whether the tibial group is acting, or whether it has been so stretched by the unopposed muscle pull of the peroneal groups that they cannot function.

Massage is of help in poliomyelitis after the acute tenderness has disappeared. No set time can be fixed as to when massage should be started. I have made it a rule to start light massage fairly early, say four or five weeks after the initial attack, and let tenderness and pain be the guide as to whether it should be kept up. If increase of tenderness is found after massage, it should be discontinued, and instituted later. Too much massage is a rather common error among physiotherapists, and is worse than leaving the patient alone. It only tends to fatigue the muscles, and rather predisposes to atrophy of the affected muscles. It is sometimes a problem to convince the parents that light massage, of twenty minute periods, two or three times a week, is sufficient. Massage, in the mind of the average laymen, is given more credit than it deserves. Do not mistake me, I am a strong advocate of massage, but simply as a means to an end, and with no idea of restoring muscle power. I quote from Kleen:

"The favorable action of massage on parts affected by infantile paralysis is undoubted, but it must be recognized that it has distinct limitations and that too much must not be expected of it. The proper stroking, kneading and manipulation of an affected limb, placed in a position where affected muscles are relaxed, stimulates the flow of venous blood toward the heart and increases the flow of arterial blood to the limb. It also facilitates the flow of lymph toward the center of the body by mechanical emptying of the lymphates and direct maniplation of the muscles must also in a measure empty them of waste products."

If a trained physiotherapist is not available it is far better to keep the patient at rest in splints, or split cast, and have the joints carried daily through their normal arc of motion, rather than have them unintelligently handled. It is well to remember that massage is benefiting the active muscles in a paralyzed limb, and in so doing, is having the same effect as functional use thereby tending to produce or increase deformity, unless supportive measures are used in conjunction with the massage to prevent overbalance of muscle pull. A stretched tendon is an inefficient tendon, and does not respond to the motor impulses, even after nerve power has been restored. I have purposely devoted quite a little space to the acute stage of poliomyelitis, and, if it is borne in mind that the main object of orthopaedic treatment is the prevention of deformity and restoring of function one can easily understand why this has been done.

I am often asked when treatment should be started. It should be begun as soon as diagnosis has been made, that is, the supportive part of the treatment. Unfortunately, outside of hospital services, many of our cases come to us rather late in the acute stage, and well along in the convalescent stage, with deformity well established from the pull of unopposed muscles, force of gravity, or functional use. Recently at the Children's Hospital we have given in all house cases convalescent serum. It should be administered early at the very onset of symptoms before the paralysis can be detected and when probably the only clinical findings are the usual signs of acute infection, plus the stiffness of the cervical spine. I and my associates in the hospital feel the serum has a distinct place in the treatment of poliomyelitis. To sum up the points in the acute stage of treatment we should have:

1. Convalescent serum.
2. Complete rest.
3. Early immobilization.
4. Prevention of muscle pull.
5. Delay of massage until tenderness and pain have disappeared, or until the convalescent stage.

Treatment in Convalescent Stage. During this stage of the disease patience of surgeon and parent should be of the stoutest. Mental attitude of the parents, ability to understand what the surgeon is attempting to do, and whole-hearted co-operation are of the greatest importance. It is in this period that much damage to the patient can be done. Parents are prone to become lax in their vigilance, or worse still, they are apt to drift into the hands of osteopaths and chiropractors. Constant supervision and checking up should be kept in mind as of the greatest importance. Here too, intelligence or lack of it, in the child, comes in as a help, or a hindrance. A bright hopeful youngster will grasp very readily the idea of muscle training, and will succeed, where the dull child will fail. This applies equally to parents, an intelligent mother being a top sergeant in carrying out instructions. Muscle training will improve function and strengthen weakened muscles that are slowly coming back to normal, but care should be taken not to go to the point of fatigue at each sitting.

Should these cases be allowed to walk? Lovett, in his recent book is rather inclined to keep the child from weight bearing in lower limb paralysis. He cites, for example, that the right hand recovers more effectively than the left, because of the natural tendency to use the right hand, and that in the legs, the rate of recovery is the same, which he interprets as definitely showing that exercise under proper control is good, but with weight bearing not so good. I can only judge from experience whether or not we should allow weight bearing, and here again enters the personal equation. If patients cannot be kept under observation, as, for instance, patients who live in the country and can only report at irregular intervals, I allow them to walk, with a proper brace to prevent contractures and deformities from overbalance of muscle pull. Such children are going to be allowed to hobble around whether we have interdicted weight bearing or not, and these are the much-deformed patients seen in the chronic stage with

changes in the bony structures, due to stretching and contractions of the soft parts. Patients who are under rather constant supervision should not be allowed to walk until well along in the convalescent stage. By keeping them from weight bearing, but allowing exercises and muscle training, we can prevent fatigue and stretching of weak or paralyzed muscles, and hasten return to normal.

It is in this period of the disease, if back muscles are involved, that great care should be exercised in allowing these children to sit up unsupported. Many of our non-rachitic scoliosis patients, so markedly twisted and deformed, are the result of neglected poliomyelitis backs. Even with supportive casts and jackets these cases are very apt to go on to scoliosis if the muscles do not return to normal. Back paralysis is somewhat different from extremity paralysis, in that the deformity here is directly due to the paralyzed muscles, and not to muscle pull of strong muscles. The convexity is toward the good side. Split casts should always be worn where back muscles are involved, only to be removed for massage and cleansing. The support of the upper extremities on airplane splints, to prevent muscle pull by the weight of the arms, very often prevents subluxation of the shoulder. A suitable splint for the hand, in paralysis of the wrist, is advised, generally a cock-up splint. Before passing on to the treatment of the chronic stage of poliomyelitis, I will conclude the treatment of this stage by emphasizing these points:

1. Close supervision.
2. Intelligent understanding between parents and surgeons, and,
3. Quoting from a recent article by Legg, "emphasis an the evil results of over-fatigue, general exercise treatment without regard for muscle balance; and weight bearing without mechanical support in positions which favor deformity."

Treatment of the Chronic Stage. Massage during this period is of benefit, especially to weakened muscles, and following any operative procedure which may have been done. During this stage fatigue should also be guarded against. Many of our cases, which seem to progress satisfactorily through the acute and convalescent periods, are found, several months later, to have gone back. Muscles that have shown slight twitching, and even those which have been functioning, are seen to relapse to a state of flaccid paralysis. I believe this is brought about in great measure by forcing these children to a point of fatigue. Complete rest and gradual return to activity will often prove effective in restoring muscles to the point reached before relapse.

Braces. Apparatus of various types is most beneficial in this stage. Apparatus may mean anything from tilted heels and soles for a moderate valgus deformity, to rather cumbersome braces to stabilize flail legs, and allow the patient to indulge in "caliper" walking with crutches. I am not a believer in loading these children down with complicated braces, and they should only be used, made as simple as possible, where no operation can be advised that will prove of benefit. It we are to guard against fatigue, heavy braces are certainly not indicated. Following operations, especially tendon transplantation, some form of apparatus, depending on the individual cases, is necessary during convalescence to hold the limb in the position of choice until stability has been established.

Operative Measures. One has only to read the many articles written by orthopaedic surgeons to learn how many different views can be expressed as to the best operation for given conditions. My own personal opinion is that we often lose sight of what any operation will do at best, namely, stabilize and establish muscle balance around a joint. If we attempt to transplant tendons with the idea that these transplants will act in exactly the same manner as the healthy tendon before paralysis, we are often doomed to disappointment. To expect, say, a ten horsepower transplant to do the work of a forty horsepower tendon, and this too in an entirely different direction and angle, is to expect too much. A recent article by Platt brings out many interesting points in this connection. He states that normally tendons of muscles with given strength are inserted in just the right part of the skeleton to overcome counter pull of certain other muscles diametrically opposed. He wisely thinks that in doing our transplants we not only over or under-estimate the strength of our transplanted tendons, but attach our tendons in such a way that our leverage is poor. Another factor of importance in considering our transplants is our after-treatment. Legg has written a most sane article in a general review of this subject. He says:

"Another point to be considered in determining the operation to be used is the fact that transplantations are bound to fail unless good post-operative treatment is carried out. The transplanted muscle is temporarily weakened by the operation and must have careful massage and exercise to enable it to regain its strength. It also must be given careful re-education to enable it to take up its new function, for in many cases the mere mechanical change in its new line of pull will not cause it to produce the new action. If the cases are not carefully re-educated, they will not acquire the new function and the success of the operation is lost."

It can readily be seen, therefore, that many of our patients have to be eliminated from consideration of tendon transplantations because of the length of time they have to be kept under observation. In this group come patients living at a distance, and those whose parents will not co-operate in the aftercare. No tendon work should be attempted until existing deformity, due to change in bony structures, has been remedied. Time will not permit detailed description of the various tendon operations which have been performed with more or less success, and bear the names of their originators. Some are good, many are not successful, perhaps, because of poor technique, at the hands of disciples. I have used the peroneus longus for the tibialis antious for overcoming valgus deformity; the insertion of the peroneus longus and tibialis portious into the oscalcis to act for the tendo-Achillis; the use of one of the hamstrings for the paralyzed quadriceps, all with a moderate degree of success; but I cannot say that I am an enthusiastic believer in the universally good results reported from time to time. The use of silk ligaments has not been successful.

To overcome contractures, we resort to gradual stretching and application of casts, or to the more rapid procedure, tenotomies and fasciotomies, with the tendo-Achillis as the most often tentontomized. I am very much of Legg's opinion that open tendon lengthening is the operation of choice if the tendon cannot be manually stretched, rather than subcutaneous tenotomy. I do not believe a surgeon should work blindly when it is so simple to make an incision, judge the amount of length you want and see exactly what you are doing. Insertion of tendons into bones to act as checks and to stabilize joints has been done with varying results. Most of the difficulty, if these cases are followed up, is due to the stretching of the tendons that have been so used. Gallie's results from his operation are probably better that in the hands of other surgeons.

After looking over our records in the office on cases done by the late Dr. Wm. G. Erving and myself, and noting the results as reported by various writers, I believe the bone operations, including osteotomies, with or without removal of wedges, arthrodesis operations, and for the lower extremities, Whitman's astragalectomy, will, in the great majority of cases, everything taken into consideration, prove more successful in accomplishing functional results. Whitman's astragalectomy, with strict adherence to his technique, especially in displacing the foot backward, has been in our hands the operation of choice for stabilizing the foot.

For flail knee, with good gluteal muscles, arthrodesis of the knee gives good results. We have not been so successful in the few attempts made to stabilize the hip. For flexion contraction of the hip, we have used Soutter's operation (transplantation of the hip flexors at the ilium which consists of sub-periosteal stripping down from the ilium of the hip flexors). This operation has been successful in that the patients were made more comfortable. It allowed us to get them about on braces with weight bearing on the formerly flexed leg.

In back and abdominal paralysis, the use of, first, a plaster jacket, and a more permanent jacket of leather or celluloid, is indicated. Albee's bone graft for fixation of the vertebrae should be considered as logical. It certainly does improve the scoliosis, and has been successfully used by a few American surgeons.

Upper extremity paralysis is somewhat different from lower, in that we do not have to content with weight bearing. We do have, however, to figure on finer motions, especially as regards the hand. Tendon operations to overcome wrist drop, and transplantations to give use of the thumb, are quite successful. Tendon transplantations of the opper arm, however, are not so successful. In deciding on operations on the upper arm, one important factor must be borne in mind. It is useless to do anything to improve function of the opper arm if the hand is useless, for after all the arm is only a sort of lever to bring the hand into play, and with a flaccid hand an improved arm is worthless.

Arthrodesis of the shoulder for deltoid paralysis, especially if the trapezius is active, is the operation of choice. In thus fixing the shoulder we obtain a scapular motion and the trapezius will act as an abductor of the arm when the patient shrugs the shoulder.

Summary in Treatment of Chronic Cases:

1. Judicial use of braces.
2. Tenotomies and fasciotomies for correction of minor deformities.
3. Osteotomies, arthrodesis operation, and astragalectomy, are the best stabilizing operations.
4. Tendon transplantations in selected cases, used alone or combined with other operations.

I have purposely omitted much of importance from the standpoint of the pediatrician and the general practitioner. The use of electricity in the treatment of poliomyelitis has not been touched on. We have had no experience with electricity and have always thought that massage is much better, as being more easily controlled to prevent fatigue.

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The Use of Diathermy in Gonorrheal Pelvic Infections

By B. F. Iden, Jr., M.D., 1801 I Street, N.W., Washington, D.C.

The first report of the use of diathermy in gonorrheal infections of the female was written by Dr. Corbus about five or six years ago. The principal of this treatment was based on the fact that the gonococcus was destroyed almost instantly by a temperature of 110° Fahrenheit. Corbus reported a number of cases with complete cure after being under observation for two years.

Diathermy is the application of an electrical high frequency current to the body by means of electrodes. The degree of heat is regulated by the size of the electrodes, the amount of current used, and the density of the tissues treated. The greatest degree of heat generated will be near the smallest electrode.

The method of administration employed by us is by means of abdominal electrodes about four by eight inches and a sacral electrode approximately the same size attached to one terminal with a small vaginal electrode attached to the other terminal. By means of a thermometer extended into the vaginal electrode the degree of heat at this point is determined.

In every case it is endeavored to gradually raise the temperature to 43° C and to hold this temperature for thirty minutes. Before using the electrode the vagina is swabbed with alcohol and dried as much as possible. After the diathermy treatment a speculum is again inserted and the vagina swabbed with alcohol and some antiseptic applied to the cervix.

It is especially noted that after the diathermy treatment the thick tenacious discharge can be removed and the antiseptic applied to the tissues to a much greater advantage. By means of heat thus applied we can at least produce a hyperenia that quickens the circulation and relieves stasis in the engorged blood vessels and lessens pain.

If it is impossible to secure sufficient heat to destroy the gonoccocus, it certainly gives an increased advantage to the local application of ordinary antiseptics. In the past four years we have used this treatment in all cases of gonorrheal endocervicitis and also all cases of adnexal disease before operation. The results we believe have been uniformly favorable and no bad effects have been noted in cases of pyosalpingitis which afterwards came to operation.

Dr. William T. Cherry of New York reports 100 cases of adnexal disease due to gonoccocal infection treated at Harlem Hospital with diathermy.

Of these there were 77 cases with adnexal masses—28 were operated on and 49 were entirely relieved of symptoms, operation unnecessary or refused by patient. In concluding his article Dr. Cherry says:

"I would venture to assert that diathermy is probably the most satisfactory available agent for the conservative treatment of pelvic infections due to gonococcus. It relieves pain, diminishes pelvic masses, and aids in complete resolution. Used as a preoperative therapeutic measure, it will eliminate many of the technical difficulties of the removal of pelvic masses and thereby contribute to a smoother convalescence. Incidentally, the percentage of postoperative wound infection is lessened."

Index to Current Literature on Physical Therapy

(Continued from page 445)

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Is Physiotherapy of Therapeutic Value in Otolaryngology and Ophthalmology?

By Frank L. Alloway, B.S., M.D., Washington, D.C.

I have heard this question asked so often among otolaryngologists and ophthalmologists that I think it pertinent at this time to make a summary of my ten years work and observations along this line of physiotherapy in its relation to the preoperative and postoperative treatment of surgery and of disease of the eye, ear, nose and throat.

First let us glance at electro-therapeus of the eye.

Diathermy can be used on the eye with proper applications without any harm to the cornea or eye contents. I used in twenty-eight cases of cataract over a period of two years, 1200 treatments directly through the lens. (See I. U. Medical Journal, May, 1928). Out of the twenty-eight cases one recovered 20/20 vision, a number of others were slightly improved and no damage was done. My percentage of results was low, I now know, because I tried to remove or dissolve cataracts that were fully formed or of severe infective foci. If diathermy is started early in senile cataract of the nutritional defect type, I think very good results can be obtained or at least arrest the process for some years. If the cataract is fully formed or vision less than 20/50, the prognosis is poor. Diathermy can also be used in glaucoma for relief of pain and if properly carried out may even arrest some cases. I can at least say that intraocular pain of most any type can be relieved for hours by Diathermy and tension lessened.

Blepharitis, iridoyclitis, cyctitis, and many chronic conjunctivitis cases are benefited by this treatment.

On ear cases, the water cooled quartz lamp can be used in otitis media by direct application of the small rod into the canal. The ultra violet radiation of the postoperative draining wound in mastoid cases will cut down the convalescence as much as three weeks and to some extent lessen the scar formation. Diathermy gives good results in the beginning cases of catarrhal otitis media by drying out the eustachian tubes and lessening the chance of adhesions between the ossicles of the ear and the drum preventing deafness.

Tinnitus is sometimes benefited and is at least worth a trial as most everything else fails in a number of cases. I have seen several cases markedly improved by diathermy directly over the ear going up to 500 for ten minutes.

The nose does not respond well to treatment but the nasal accessory sinuses following drainage and proper operative procedure are often benefited by zinc ionization.

The mouth, gums and tonsils are often benefited by the water cooled quartz light.

The larynx can be treated by diathermy directly through the neck or by the water cooled quartz lamp. In laryngeal tuberculosis, this method can be used in conjunction with the general sunlight treatment used in the pulmonary cases. A long curved quartz rod is introduced into the mouth, while the patient holds his tongue forward in a piece of gauze. If necessary the throat can be first sprayed with a 4% cocaine solution but I find in most cases this is not necessary as these patients are usually well trained in the art of laryngeal treatment. Dr. Joseph W. Miller of New York tells of seventy-four cases of laryngeal tuberculosis treated with artificial sunlight (water cooled quartz lamp). He says "two did not respond to radiation. Of the other seventy-two patients, fifty-nine showed complete healing of laryngeal lesions, with no subjective symptoms referable to the larynx. The other 13 cases while improving from their subjective laryngeal symptoms, demonstrated either partial or no healing of the tuberculous larynx." I personally never had such remarkable results as most cases of laryngeal tuberculosis tend to follow somewhat the trend of their pulmonary condition. But I find the water cooled quartz lamp of great benefit in those cases where there is an arresting of the lung condition. In some cases cautery gives the best results, followed later by quartz light and oil injections.

It is well to use some oily solution in the ears, nose or throat after quartz light treatment as it gives comfort to the patient and stops the burning irritated feeling that follows such treatment. I have used for some years this preparation: Camphor (gum) Gr. X; Menthol (crystals) Gr. X; Choloratone crystals Gr. II; Mineral oil gs. ad oz. I.

There are a number of other uses one can put the physiotherapy department to in your hospital in relation to eye, ear, nose and throat diseases, but there is no doubt in my mind and I can not too strongly impress upon the members of the Specialty that physiotherapy has a distinct place as an adjunct.

The Maggot Treatment of Osteomyelitis

By S. K. Livingston, M. D., Washington, D. C.

Definition.—Osteomyelitis is an inflammation of the bone marrow, or of the bone proper and marrow. It may be acute or chronic. The acute form is a septic or blood poisoning process and is marked by fever, chills, with a decay of the bone extending to the neighboring parts with abscess formation. The chronic form occurs after injury or from rheumatism, syphilis, or tuberculosis. It also results in abscess of the bones and adjoining soft tissues. It is specifically this type of disease that maggots cure, as you have seen in the pictures.

History.—In scientific and literary writings of ancient and medieval times references are made to the beneficial value of maggots in wounds sustained in war. Andrew Paro, 1510-1590, writes in a treatise called Fabrica how his supply of burning oil gave out one night in camp and how he profited by the experience to the extent of leaving the wounds sustained that night in battle untreated with the hot oil, and how the wounds became filled with maggots to the benefit of the sufferer. Benvenuto Cellini in his memoirs, tells of maggot-infected wounds as the men lay on the battle field; probably the reason they recovered. Joseph Leidy, 1823-1891 in his researches in parasitology, speaks of maggots among the other parasites. Dr. Barton C. Hurst, late professor of obstetrics in the medical school of the University of Pennsylvania, tells among his interesting stories of his daily morning duty in going from ward to ward in the university hospital and scouping the maggots from the surgical wounds in the summer time. This was during the last 10 years of the last century when the point of view had changed somewhat, and maggots were no longer considered beneficial scavengers, as in the Middle Ages, but were considered contaminators of wounds and harmful. So it seems that since the middle of the nineteenth century, when antiseptics were discovered and became universally used, that they supplanted all other methods of cleansing wounds. Due to the fact that during the last 80 years the treatment of wounds by antiseptics has supplanted the older treatments, great credit is to be given to Doctor Baer for the reestablishment on a scientific basis of a treatment which is effective but which had been discarded for other less effective treatments.

About the middle of the nineteenth century Lord Lister developed in England what is known as aseptic technique for the treatment of surgical cases which prevented as its object infection at the time of operation. The word aseptic means without infection, or in commonplace parlance clean wounds—that is, wounds free from bacterial infection. This technique consists in the sterilization of the skin at the site of operation, the boiling of the instruments used for 10 minutes, the scrubbing of the operators' and assistants' hands for 10 minutes followed by the application of iodine, bichloride of mercury, or alcohol to the hands and arms, and the wearing of rubber gloves during the operation, and the application over the closed wound of sterilized dressings. All this has made surgery possible, and is the technique universally used to-day by surgeons. If this rigid technique is necessary to prevent infection of wounds at time of operation, it can be inferred that all wounds sustained through accident or in war are infected; that is, they are septic, unclean, or filled with bacteria. So all bone injuries under ordinary conditions of life, and especially during times of war, due to the insanitary surroundings, tend to or actually develop osteomyelitis. During the last war osteomyelitis wounds were treated by freely opening the soft tissues at the site of injury, chiseling away the dead bone, insertion of drains, and hourly irrigations of the wound with a chlorine producing antiseptic solution known as Dakin's solution. Later in the war the British found that osteomyelitis infections did equally well if opened and irrigated with salt solution. The irrigation acting mechanically to wash away the poisons as they formed, thus avoiding the irritation to the tissues caused by the chlorine in Dakin's. This method of treatment followed that recommended by Doctor Halstead in the latter part of the nineteenth century consisting of radical surgical removal of dead bone by operation followed by irrigation with gallons of bichloride of mercury, packing of the wound with iodoform pack and the application of a plaster cast. All these methods of treatment are successful in only about one-third of the cases.

The failure in two-thirds of the cases is due to the fact that it is practically impossible to remove all infection at the time of operation, and the irrigation does not reach the deep pockets and sinuses of the wound and bone which are infected. Thus with this older method of treatment surface healing occurs with underlying pockets of infection which subsequently forms new abscesses, which process goes on indefinitely, as has been the history of the cases in the Veterans' Bureau. It is because of the inaccessibleness of these underlying pockets, which often are not visible, coupled with the virulence of the infecting germs which grow in these cavities, that the treatment of bone infections has become such a problem. With this difficulty is coupled blood stream infections (blood poisoning) caused by the germs that enter the wound at the time of injury. The blood carries these germs from the original site of injury to remote parts of the body, the germs lodge in other bones and new abscesses are formed. It is in overcoming these disadvantages that the maggot is successful. By their scavenger nature they seek out infected areas which are invisible, they devour whatever diseased bone is left at time of operation, and in addition to this they secrete healing chemicals which stimulates healing. So they are used to supplement the work of the surgeon by doing those things which he can not do, and by doing the things which chemicals can not do.

Osteomyelitis is one of the great medical problems of peace, but is a far greater problem in times of war. This is because of the insanitary conditions found in the trenches, and the lowered resistance of the men to infection due to exposure, improper food, and mental anxiety. Gunshot wounds carry pieces of clothing and skin, which in the trenches is always infected, into the wound, and in those cases involving the bones osteomyelitis results. Under war conditions the disease early resolves itself into a chronic state which with the former method

of treatment healed superficially, broke down, rehealed, and again broke down over a period of years, with a gradual depletion of bodily resistance. Thus those patients became permanent invalids or at the best semi-invalids, having to receive treatment at intervals for several weeks yearly, but still never healed. This history applies statistically as stated above to 66 per cent of the infected cases. The sites of infection may be single or multiple, with chronic discharging sores, which sores become reinfected many times from the surrounding skin as time goes on, causing great undermining of tissues with slowly progressive softening and destruction of one or more bones of the body ending in invalidism, a series of operations over a period of years with its attendant neurotic developments. So a treatment which can successfully combat this scourge is indeed dramatic. Adults and children of all ages are subject to this disease, which is comparable to cancer or tuberculosis, and to again make useful citizens of otherwise permanent invalids in a period of from one to six months is an achievement for which full credit must be given to Doctor Baer. Those of you who have seen osteomyelitis during the later war, and in our Veteran's Bureau hospitals where there are numerous cases realize its tremendous economic factor. Acute chronic, and tubercular osteomyelitis benefit by this treatment. The method of treatment for all types of cases is essentially the same, and is as follows:

The area infected is opened widely by operation, the dead bone is chiseled away and the wound is packed with gauze drains for 48 hours. After the 48 hours has elapsed, which time is allowed for all bleeding to stop, as the maggots do not like blood, the maggots are introduced, as you saw in the pictures, four or five times, at 5-day intervals. Before introducing the maggots each time the wound is washed out with sterile salt solution. The scavengers are held in place by wire cages made to fit each wound, held in place by adhesive tape strips. No further dressing is applied, the wound being free to the air and light. No antiseptic is used on the wound other than the maggots, who are living antiseptics, and who seek out the crevices and crannies for their food. In marked contrast to the aseptic technique of Lord Lister no antiseptics are used, as they impede the activity of the maggots. The scavengers who are hungry commence their work at once when introduced, and an inspection of the wound shows them noses down, tails up, engorging themselves, and burrowing into the remaining infected tissue and bone. After about three applications of the maggots the wounds look pink and healthy, in marked contrast to the red and dead looking of an osteomyelitis untreated, the pink color being a sign of healthy wounds.

The maggots used are those from the blow fly (bluebottle, California erythrocephalia), and from the green bottle fly (Lucilia Caesar) of the family Muscidae. These flies breed only in the late spring, summer, and early autumn months in this zone. So one of the real problems has been the breeding of flies the year around. Formerly it was necessary to import the maggots from Florida by airplane, but finally after considerable study it is now possible to hatch the eggs in a specially constructed incubator. This work is very technical but is being successfully carried out. In this work aid has been received from Doctor Karrer of the Maryland Academy of Sciences in Baltimore, from Miss Knight who has perfected the technique of incubation and who carries out the bacteriology of the maggots for the control of disease among the flies, and in the wounds, and from the Bureau of Entomology in Washington. The flies will breed and their eggs will hatch if they are kept at a certain temperature and saturation point for humidity in the incubator. They are fed on honey, yeast, bread and milk, and water—nothing could be purer, which is far from the accepted theory that flies live on putrid material. Within the incubator are small cages in which the flies are housed. On the floor of these small cages are small glass dishes holding liver, on which the flies lay their eggs daily. In 24 hours after being layed the eggs hatch into maggots, and the maggots remain as such for seven days, after which time they again undergo another change known as pupa, in which form they look like small snails. In this form they are dormant requiring no food. After 14 days as pupa they again metamorphose into a fly, who again after five days lays eggs and the cycle is again repeated. Miss Knight has so perfected the process that now a daily production of maggots is possible.

It is a proven fact that flies are carriers of disease. The diseases carried are typhoid fever, summer diarrheas of children, cholera, tuberculosis, anthrax, diphtheria, gonorrhea, eye infections, infantile paralysis, plague, smallpox, tropical ulcers, relapsing fever, sleeping sickness, yaws, eggs of parasitic worms, etc. Also the flies are attacked by certain diseases perculiar to flies such as empusa musca, a disease caused by a fungus growth covering the body of the fly. This disease kills many of our hatched flies, and is another problem of incubation. Bacillus pestis, which is the germ causing the historical bubonic plagues of Europe, also attacks flies. Mites of various kinds cover the bodies at times of the flies causing their death, and at other times internal flagelles of worms are seen swarming the intestinal tract of the maggots and flies. The most common and therefore the disease to be most guarded against in the production of maggots is that of tetanus or lockjaw. To protect our patients against the introduction of the germs causing these above-named diseases, which germs cling to the body of the maggot; it is necessary to produce maggots free from disease, and free from germs. The process of producing sterile or disease-free maggots is a highly technical and scientific one, and suffice it to say without going into details that this is now being done, cultures being taken from all specimens used to prove their freedom from bacterial infection.

The Etiology, Diagnosis, and Treatment of Lumbo-Sacral and Sacro-Iliac Strains

By Guy W. Leadbetter, M.D., Washington, D.C.

The complaint, low back pain, is ages old and the terms lumbago and sciatica have been the diagnostic scrap heap of such complaints. For with a better understanding of the physiological anatomy of the lumbar spine and the sacro-iliac regions has come a deeper insight into the differential diagnosis of such pain. We shall not discuss here the genito-urinary and gynecological causes of backache, for they are in themselves distinct clinical entities and in making a differential diagnosis obviously pathological conditions of the pelvic organs must be excluded. This paper will not deal with the arthritic causes of backache but with the mechanistic derangements of this region only.

The anatomy of the lumbar spine and sacro-iliac regions is complicated. The skeletal structures form a series of levers, the fulcra of which are the articulations. These levers are activated by symmetrically arranged groups of muscles, the most important of which are the posterior group, consisting of the hamstrings, the glutei, and the lower part of the sacrospinalis; the antero-lateral group, consisting of the quadratus lumborum, the psoas major and the intertransversales; the anterior made up of the abdominales, for on these last by their attachment to the ribs, iliac crests and pubes depend a direct postural influence on the lumbar spine. It is to be noted that most of these muscles bridge over one or more movable articulations. The ligametous structures on which most of the support of this region depends consist of posteriorly, the interspinous, supraspinous, lumbo-sacral, iliolumbar, sacro-iliac and sacrotuberous; anteriorly, of the very strong intervertebral and sacro-iliac ligaments. The sacro-iliac joints and the intervertebral articulations are lined with normal joint cartilage and with synovial membrane. From a retrospection of the above it follows that the ligaments and the muscles support a narrow and unstable column of bones, the base of which supported by the sacrum, wider in front than posteriorly and never intended for weight bearing in the erect position presents to us the mechanically weakest portion of the spine and the most susceptible to trauma. The ligaments are reinforced by and depend upon a certain amount of muscle tone. Interspersed among these muscles and articulations is found the great outpouring of nerve roots from the lumbar enlargement of the spinal cord. The peripheral nerves which are of interest to us in the diagnosis of low back conditions consist chiefly of the sciatic nerve, its terminations and the superior gluteal nerves. The peroneal branch of the sciatic arises mainly from the fourth and fifth lumbar and the first sacral roots. The tibial portion arises from the fourth and fifth lumbar, the first, second and third sacral. The nerve to the hamstrings, another division of the sciatic, arises from the fifth lumbar, the first, second and third sacral. The superior gluteal branch arises from the fourth and fifth lumbar and the first sacral. The origin of these nerves is important since much of the so-called sciatica has its beginning in the lumbo-sacral and sacro-iliac regions. Another important anatomical relationship is that of the neural canals, the fifth lumbar being the smallest and yet containing the largest of the nerve roots. The proximity of the sacro-iliac and lumbo-sacral junctions must be emphasized, since it is often difficult to determine whether the tenderness is sacro-iliac or fifth lumbar in origin.

With the presentation of these anatomical facts, this knowledge should be utilized in making a differential diagnosis between sciatica which is true peripheral neuritis and sciatic pain which is the referred neurological element so often found in low back conditions. By far the greatest portion of sciatic pain terminates its distribution in the peroneal branch lying on the outer side of the leg and foot. This type of pain is more often lumbo-sacral than sacro-iliac and is usually due to mechanical disturbance between the fifth lumbar and the top of the sacrum where the root canals, that of the fifth being the smallest in the lumbar region and yet permitting the largest nerve root to emerge, directly encroach upon the nerve substance. Sacro-iliac pain is more often referred down the course of the sciatic and its tibial branch. Lesions of this joint may involve the nerve to the hamstrings and we shall see later in the symptomology that this frequently brings about a striking effect which must be relieved before a cure can be hoped for. These latter nerves do not run in close relation to the sacro-iliac joints and unquestionably the pain from these articulations is a referred arc pain through the sympathetic fibres supplying these joints through the lumbar cord and hence, the reference is down the peripheral nerve whose root origins correspond to the same neurological level. In these types of referred pain one would not expect and rarely finds, tenderness on pressure over the sciatic trunk. True sciatica can be readily differentiated by the exquisite tenderness over the course of the nerve.

The etiological factors of mechanical derangements of the lumbo-sacral and sacro-iliac articulations are many and may be classified as follows:

1. Traumatic.
   a. Lifting.
   b. Twisting.
   c. Stooping.
   d. Falls.
   e. Direct blows.

These may cause sacro-iliac and lumbo-sacral strain and spondylolisthesis. Fractured transverse process.

2. Congenital.
   a. Sacralization.
   b. Spina bifida occulta.
   c. Extra lumbar vertebrae.
   d. Impinging 5th lumbar transverse processes.
   e. Spondylolisthesis.
3. Postural.
   a. Sway-back.
   b. Extra lumbar vertebrae.
   c. Unstable 5th lombar.
   d. High and broad sacrum.
   e. Foot conditions.

4. Previous, or concurrent general organic disease.
   a. Asthenia.
   b. Poliomyelitis.
   c. Visceroptosis.
   d. Scoliosis.

From the above classification, it may be seen how important an exact diagnosis is. The problem of the industrial back has confronted us for several years and a knowledge of the underlying conditions is most essential in determining the liability and prognosis, for a congenital abnormality is a source of potential weakness in the physical make-up of the individual. Many states have attempted unsuccessfully to pass legislation requiring an X-ray study of the lumbo-sacral region of employees before services are engaged. This would go far toward fixing the liability of alleged injury. The non-traumatic backache is usually readily determined by an examination.

Such a diversification of etiological factors can only lead to a complex symptomotology. The chief complaint is usually one of pain in the "hip" or lower back. The pain may be sharply localized, may be generalized over the whole lower back, or may be referred to the gluteal region, or down the entire leg. Pain on change of position is frequent. Relief occurs after the patient has maintained the position assumed for a period of time.

Turning in bed elicits pain in the lower back. The discomfort of these conditions is relieved by rest more often than not. Another noteworthy symptom, frequently complained of spontaneously is a painful tension of the hamstring often accompanied by pain at the posterior aspect of the knee joint and sometimes referred to the heel. Following these voluntary complaints one may derive more detailed information concerning the paths of the referred pain by careful questioning. For example, one can determine whether the pain is tibial or peroneal, whether it is entirely localized in character or whether there is any paraesthesia over any portion of the extremity. The patient's own statement as to the causation of the symptoms is often of value in localizing the lesion.

Following the voluntary recitation of such a chain of symptoms and with the knowledge of facts obtained by careful questioning, we can approach an accurate diagnosis by a thorough routine of examination.

1. Inspection. With the patient stripped, standing without shoes, one should note the general contour of the back, the presence of any prominence of one, or more, of the spinous processes, any evidence of scoliosis or of spinal tilting. Spinal tilting is a list of the spine either to the right or left with the lumbo-sacral articulation as the fulcrum. Often an excessive muscle spasm may be seen on inspection. Viewing the patient standing in profile, the alignment of the posterior angle of the scapulae and the posterior portion of the buttocks should be carefully noted. The contour of the abdomen in these cases is frequently found to be of the protuberant type. The carriage of the head is also important, as, in postural conditions, it is carried too far anteriorly. The active motions of the spine should be carefully observed. Normally, the greatest amount of motion is in the lumbar and the cervical regions; the thoracic spine bending but slightly because of its fixation by the thoracic cage. Hyperextension is almost entirely confined to the lumbo-sacral junction. Lateral bending to either side is likewise almost purely a lumbar function. These motions should also be determined from the sitting position to eliminate the possibility of faulty leg mechanics.

2. Palpation. With the patient fully relaxed, one should palpate gently to determine the degree of spasm of the sacro-spinalis, the gluteal and the hamstring muscles. The level of the posterior-superior spines and of the anterior-superior spines should be carefully noted. The sacro-iliacs should be palpated for tenderness, also the lumbo-sacral junction, the spinous processes of the vetebrae, and all the lumbar transverse processes. The coccyx, the gluteal regions and the sciatic nerves should be examined for points of pain on pressure. The sacro-iliac joints should be palpated through the abdomen; frequently definite tenderness may be elicited. This point corresponds not to MacBurney's point but to a point one inch below and lateral to the umbilicus. Straight leg raising should be attempted to ascertain the amount of hamstring spasm. This is important when we recall that the posterior leg muscles and the back muscles are acting on a series of continuous levers and that the nerve to the hamstring muscles is involved in lower lumbar conditions. Rotation of the hip inward and outward should not be neglected to determine gluteal spasm. Frequently the inward rotation of the hip produces pain in the adjacent sacro-iliac. In all cases of low back pain, an X-ray of the lumbar spine and the sacro-iliacs together with a lateral view at the level of the 5th lumbar vertebrae should be a routine requirement. Occasionally a view taken at 45 degrees to the horizontal clarifies the condition of the lumbo-sacral junction. The reflexes should be tested. The feet should be carefully examined to eliminate postural difficulty. Frequently pronation and abduction together with a shortened Achilles' tendon are found to be the cause of obscure backache.

Following such an examination, a diagnosis may be approached with a reasonable degree of surety. In this respect let me once more emphasize the necessity of a careful and painstaking history in order to establish definitely the distribution of the referred pain. Lumbo-sacral pain is most commonly peroneal and sacro-iliac pain more tibial. Lumbo-sacral lesions usually present a bilateral muscle spasm and the limitation of motion is usually found in lateral bending of the lumbar spine. Sacro-iliac lesions restrict the motion more in flexion and in these latter the muscle spasm is usually unilateral and often on the side opposite the injured synchondrosis. Tenderness in a single lesion is sharply localized and in sacro-iliac conditions one should hesitate to make a diagnosis of injury to these joints when the tenderness is over the upper part of these articulations, as frequently pain on pressure may be elicited over the ilio-lumbar ligaments if the lumbo-sacral junction is involved. A striking flattening of the lumbar lordosis occurs in acute sacro-iliac strains, in the reverse type of spondylolisthesis and in strains of the lumbar muscles. In a unilateral sacro-iliac strain the spine is often tilted to the opposite side. Tenderness on palpation of the abdomen directly over the articulation is of some value. On straight leg raising, the Kernig sign, pain may be referred directly to the point of injury, whether it be a sacro-iliac or lumbo-sacral. It is admitted that one may arrive at a diagnosis of lumbo-sacral or sacro-iliac by these methods, but this does not establish the underlying cause, since in many instances a sacralization, spina bifida, spondylolisthesis or some early malignant lesion may be present; hence the necessity of a routine X-ray, both a stereoscopic anterior-posterior and lateral view. The traumatic cases may be separated from the nontrau-

matic by the patient's own statement as to how the disability started.

Following a definite diagnosis, the next problem is that of treatment. One should approach this only after careful consideration of the type of injury and the occupation of the individual. Rest in bed with the patient recumbent on a fracture board in order to prevent a semiflexed position of the spine is the best method of splinting and insures opportunity for the relaxation of muscle spasm; this should be supplemented once or twice a day by the application of heat through the medium of the thermolight or the infra red light, or lacking these the application of hot wet packs over the involved region. Each application of heat should be followed by message of the lumbar, gluteal and the hamstring muscles. After three to four weeks of such treatment, if all muscle spasm has disappeared and the patient can stand erect with some comfort, he may be allowed up following the application of the proper support. For sacro-iliac relaxations this should consist of a belt no wider than four inches, since one does not desire to compress the upper rim of the ilium. Lumbo-sacral support demands fixation in the vertical direction and either a heavy belt eight to ten inches wide reinforced by steels, one on either side of the spine, or a modified aluminum spinal support is satisfactory. During this period of fixation, physiotherapy as outlined above should be continued. In severe cases the application of a plaster jacket may be necessary. Before passing on to the more radical types of treatment, let me mention one or two points concerning strapping. For sacro-iliacs, strapping is best applied with three circular straps about three inches wide, the first running from the top of one trochanter to the other, the other two overlapping this slightly, care being taken not to strap above the iliac crests. These should be applied as tightly as is consistent with the comfort of the skin and should be removed every four or five days in order to prevent irritation of the skin.

In cases of unilateral sacro-iliac strain which resist the above treatment, one should consider the necessity of manipulation. This consists of stretching the tense hamstring muscles under an anesthetic and the application of a tightly fitting plaster spica extending from the nipple line to the knee of the affected side. In two weeks this may be removed and treatment carried on as suggested in the preceding paragraph.

In chronic cases of long-standing, or in recurring cases, or in the case which shows congenital anomaly, radical procedure should be suggested. Where the sacro-iliac joint is involved alone, a Smith-Peterson operation has been most satisfactory. This consists of stripping the gluteal muscles downward from the posterior wing of the ilium, exposing the joint through a window chiseled through the ilium, curetting the joint and denuding its cartilage and reinserting the bone plug as the graft. At operation such joints are found to show evidences of long-standing trauma, such as pitting and roughening of the cartilage, thickening of the synovial membrane and even fibrosis. This operation necessitates four weeks' rest in bed on a fracture board with no other support than strapping and afterwards the application of a belt for a period of two to three months.

The severe chronic cases of lumbo-sacral arthropathies, especially those which show congenital anomalies are best suited for some form of stabilizing operations. The spinal fusion of Hibbs is the procedure of preference. One may elect the inlay graft of Albee, but due to the contour of the spine in this region and to the thinness of the sacral cortex, the first is the safer operation. It consists of fusing the spinous processes, the laminae and the articulating facets of the 4th and 5th lumbar vertebrae and the first segment of the sacrum. Post-operative treatment consists of immobilization in a plaster jacket or recumbency on a fracture bed without plaster, if the patient be cooperative, for a period of six to eight weeks. During convalescence a spinal brace should be applied, as long as any discomfort persists. The object of all the above mentioned treatment is to return the patient to his or her normal occupation permanently in as short a time as possible and therefore, one after considering all factors involved, should select the cases with due care.

In conclusion, I would like to present some impressive facts for your consideration. First, that all back cases be worked out as accurately from the standpoint of differential diagnosis as would an abdominal or pulmonary case. Second, that wherever possible the treatment should be conservative. In the delayed case, the application of vigorous and intelligent phsiotherapy is one of the best means of rehabilitating the low back strain to a point where further conservative and supportive measures may be utilized. Muscle spasm of the lower back and of the legs is always an indication for intensive treatment. Physiotherapy is also a very efficient aid in relieving the tenseness and adhesions which so often persist in the lower back for a long period following fusion operations. Third, that the traumatic industrial back is not always a traumatic neurosis and that it is our duty to select a method of treatment, be it conservative or radical, which shall restore the earning capacity of the individual in as short a time as possible. Fourth, that lumbo-sacral strains are much more common than sacro-iliac strains and the prognosis is much better. Statistics of large industrial insurance companies have shown that the average disability period from sacro-iliac injuries is sixteen weeks and from lumbo-sacral trauma is six weeks. Fifth, that research in the problem of low back conditions is still in its infancy and that if we are to progress, accurate diagnosis, long observation and painstaking records are the only means by which we may reach the acme of complete knowledge.

Mobilization of Stiff Joints

By John A. Brooke, M. D., F. A. C. S.

The problem of securing normal movement in joints stiffened by injury or diseases is often a difficult one to solve.

I want to briefly discuss this question; first dealing with limited joint movement in a conservative way, and later taking up joint reconstruction for definite bony ankylosis.

Stiffness of joints may be the result of: 1—Adhesions; 2—Prolonged immobilization; 3—Bony blocks; 4—Scar tissue about the joint; 5—Traumatic and infectious processes involving the joint and which often ends in a true ankylosis.

Adhesions are intra- or extra-articular. Those within the joint occurring as the result of rupture of the capsule, of hemorrhage into the joint, of contusion of the joint cartilages, from stubbing and also from finlammatory processes involving the synovial membrane.

Those adhesions outside the joint may include the capsule, ligaments, the insertion or origin of muscles, rupture of fibers with blood extravasation into tendon sheaths, which is especially noticeable at the shoulder..

Sir Robert Jones has outlined six methods for the prevention of adhesions:

1—To allay all inflammatory symptoms by rest and removal of strain on the injured part.

2—To obstruct local effusion of blood by pressure.

3—To massage the injured structures early.

4—To delay passive movements for a few days then to practice them in such a way as to avoid stretching of torn structures.

5—To encourage early active function.

6—To protect torn structures from strain of body weight.

As to the stiffness due to prolonged immobilization, if there is no direct injury of the joint or infection of the soft tissues in its neighborhood, we may feel quite sure that we will not have any permanent loss of movement. The obstinate cases follow fractures near the joint or occur in compound fracture with sepsis, matting together of muscles, ligaments, and tendons in a firm mass. The uninjured and uninfected joint does not become truly ankylosed by rest; it is the muscles and tendons that govern it that demand the attention. (For example, the quadriceps tendon may have to be freed from the femur and then lengthened in order to allow full flexion of the knee.)

If the limitation of motion is due to bony block such as caused by unreduced dislocation or a projecting fragment of bone from fracture, these impediments must be removed if full range of movement is to be attained. If excessive callus is a factor in these cases, passive movement must be cautiously given for constant irritation just adds to the amount of callus.

Stiffness due to scar formation can in many instances be overcome by stretching the scars by continuous pressure from an extension brace or wedging of plaster-of-Paris. Severe cases often require removal of all cicatricial tissue and plastic work on the skin with a pedicle flap from the abdomen or elsewhere. Ordinarily these contractures can be avoided if the limbs are held in an extended position during the process of healing.

When the stiffness is due to the traumatic or infectious process within the joint we may have a true ankylosis either fibrous or bony.

Of course manipulation is futile as well as dangerous if bony ankylosis is present.

Attempts at forcible manipulation in cases following septic arthritis and the strong adhesions formed after certain joint injuries are apt to avail little and often do serious damage such as lighting up the old arthritis, rupturing ligaments or even producing a fracture.

In the latter group of cases two methods can be safely tried to bring about mobilization.

1—Gradual extension or flexion by continuous pressure from a brace or from plaster-of-Paris and wedging to gain extension, or the plaster hinge and elastic to give flexion.

2—By forcing in successive stages under an anesthetic. Holding by splints or plaster the amount gained by each effort. Frequent manipulations under anesthetic just irritate the joint.

I want to briefly mention what I think is of great help to prevent ankylosis in the cases of infectious arthritis. Take as an example the metastatic gonorrheal arthritis which in many instances is severe and destructive in character and followed by a bony ankylosis.

Our treatment is similar to that outlined by the late Doctor John B. Murphy only it goes further:

1—Absolute rest of the part with extension, pulling the inflamed joint surfaces apart.

2—Relieving the tension by aspiration of the joint.

3—Injection of an antiseptic solution usually formalin two per cent in glycerin.

4—Giving of vaccines.

If the disease progresses in spite of the treatment, open the joint and wash out thoroughly with saline or mild antiseptic solution and immediately close the wound.

I have watched different cases of joint inflammation due to gonococcus, staphylococcus or other septic organisms go on to an absolutely stiff joint in a bad position when nothing was done but rest of the part and internal medication. I am convinced that the treatment mentioned above is of value and that it should be followed by active movement, massage, and baking as soon as the acute symptoms subside.

In definite bony ankylosis or the dense fibrous ankylosis of long standing, joint reconstruction or arthroplasty gives us the only result worth while, that is a movable joint that has stability.

In the past, six methods have been brought into play to give motion to ankylosed joints.

1—The earliest one was Brisement force; this, because of its futility as well as the dangers attending, has been generally abandoned.

2—Arthrolysis, which is opening the joint and separating the joint surfaces by knife or chisel and the endeavoring to keep up movement. This was done by Julius Wolff and likewise Von Eiselberg, twenty years ago. The early movement is always painful and the results are not generally good.

3—Pseudo-arthrosis consists of an osteotomy or a removal of a section of bone near the joint followed

by manipulation; this is very painful and most always followed by ankylosis.

4—Resection of the joint. This method when applied to certain non-weight bearing joints, especially the elbow, has occasionally given a good result; but the chief defect is the instability following if enough bone has been removed to prevent a recurrence of the ankylosis.

5—Arthroplasty or joint reconstruction which has been the outgrowth of resection.

The chief difference between resection and arthroplasty lies in the fact that less bone is removed in the arthroplasty and that the articular ends of the bone are shaped like a normal joint and their raw surfaces are kept apart by the interposition of some substance, absorbable or otherwise. These details are not followed out in a resection.

Baer, of Baltimore, is very enthusiastic over chromicized pig's bladder for a lining membrane of newly formed joints. Doctor John Murphy, of Chicago, to whom we owe so much in the development of joint reconstruction, used pedicle flaps of fat and fascia.

My experience has been entirely with free flaps of fascia lata and the results, especially in the ankylosed elbow joints have been good enough to make me decidedly enthusiastic over this operation in suitable cases.

Arthroplasty can be recommended in certain cases of ankylosis of the hip, elbow, and jaw. In the knee the results are not as generally satisfactory. If free movement is present we are apt to have instability. It is much better to have a stiff knee that supports the body weight than a movable one that is unstable. Putti, of Bologna, has lately shown us a method that promises a good result in the knee joint.

Many auxiliary methods have been brought into play with good results in cases of limited joint motion and stiffness which are the result of adhesions and fibrous bands within and outside of the joint. We always advise physical therapy; starting baking, diathermia, hydretherapy, and massage as soon as the condition permits. An irritable joint or one still inflamed needs rest and is decidedly aggravated by passive movement.

We aid our physical therapy measures by continuous pressure from braces, or by plaster and wedging. We believe the occupational therapy, after a certain amount of motion has been established, is of the greatest help and we always recommend certain work that will bring the affected joint into play.

We do not believe that electricity in its various forms is of much use in the mobilization of stiff joints. There is one exception to this and that is diathermy; we are certain this is of help and we now use it in most of our cases.

Ionization or cataphoresis was in favor a few years ago but has now fallen somewhat into the discard.

If physical therapy is given in a careless way and for five or ten minutes only, it is of little value. This is the way it is so often carried out in our dispensaries and in many of the places where numbers of industrial cases are treated. Results are measured in terms of function and depend considerably upon the patience and skill of the operator as well as the co-operation of the patient.

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EDITORIALS

Lillian Curtis Drew

The death of Miss Drew on November twenty-third is a deep personal loss to the Association, and to those who were privileged to know her it is very deep for she was indeed a friend. She was graduated from the Boston Normal School of Physical Education in 1893 and was for ten years with Doctor Bracket and Doctor Bradford in Boston. For ten other years she was head of the Department of Corrective Gymnastics at Teachers' College and then later at the Central School of Physical Education in New York. During the war she interviewed the girls from that section who volunteered for the Reconstruction Service of the U. S. Army Medical Department and started the emergency course in physiotherapy at Teachers' College. Her contact with young girls and students was particularly happy for in her they found a sympathetic listener and wise guide—Miss Drew was never too busy for another's problems. Besides giving from her vast fund of professional and technical knowledge she gave of herself—gifts which will be found all over the world wherever her students are gathered. No greater memorial could she have than that her students and friends carry on her happy and unselfish service.

AT CHRISTMAS TIME

By HENRY VAN DYKE

ARE you willing to stoop down and consider the needs and the desires of little children; to remember the weakness and loneliness of people who are growing old; to stop asking how much your friends love you, and ask yourself whether you love them enough * * * to trim your lamp so that it will give more light and less smoke, and to carry it in front so that your shadow will fall behind you; to make a grave for your ugly thoughts, and a garden for your kindly feelings, with the gate open—are you willing to do these things even for a day? Then you can keep Christmas.

"An organization such as ours is not a simple matter, because of the individualism which is a strong element and works against group thought and action, and yet the State organizations should determine in considerable degree the point of view of the National organization."

L. A. W.

Physiotherapy in Public Health Nursing

The place of physiotherapy in Public Health organizations has been growing in importance during the past fifteen years. Originally, the specialized departments were established to meet the emergency need following the poliomyelitis epidemic of 1916 in several large cities.

It was found necessary to have home supervision and care between the periodic clinic visits to carry out the physician's recommendations. Cases became known in such large numbers and throughout such a large territory that clinic treatment needed supplementing. Convalescent homes could not accommodate all cases, and the degree of involvement did not necessitate such care for all patients. Therefore, a large number of cases were at home—too far from the local clinic, but still needing special orthopedic treatment.

The visiting nurse associations having the opportunity of knowing these families through other channels of public health nursing, felt the need of aiding these cases but recognized the necessity of having specially trained workers. Since the initial organization, the work has developed to meet the need of the constantly increasing demand made upon it. From the emergency need, it has expanded into the field of early detection and prevention.

The question arises as to the reason of physiotherapy in public health work. Since the urge is always to secure

proper care as early in the course of any disability as possible, the nurse physiotherapist working in a public health group is in a position of peculiar advantage to give intelligent advice and assistance if she has the preparation at her disposal. Many times the family will overlook the need for medical attention or are unfamiliar with channels through which they may obtain it. At such times, the nurse acts as a means of contact between the family and physician. Frequently, the family is prejudiced against medical care, and the nurse must place much stress and time in convincing them of its necessity.

The efficiency of a public health agency in detecting and combating physical handicaps may be definitely increased by the teaching powers of the physiotherapist within the organization. It is only with the aid of Public Health agencies that a continuous program can be carried on intelligently.

Physiotherapy in public health nursing is not a duplication of service; it is advancing to meet the demand for care during periods when it may be impossible for patients to avail themselves of this service otherwise.

With the intelligent co-operation between the medical advisor, the hospital, clinic physiotherapy departments and the orthopedic nurse, uninterrupted supervision is assured the patient with as nearly perfect end results as is possible to obtain..

M. E.

Dr. James T. Watkins, orthopedic surgeon of San Francisco, California, past president of the American Orthopedic Association, one of the judges of our "contest," our recently elected honorary member and great friend, put up a problem to us while talking to our Convention meeting in Detroit. This was his message:

The medical profession for whom we work, the insurance company who pays, the patient who longs to get well are waiting for us to show them the true worth of our procedures. If we are to exist, we must prove our worthiness. And if we are to prove that the physical agents that we are constantly using are of scientific value, we must have an accumulation of evidence. Up to date the laboratory findings on Physical Therapeutic methods are far from perfected, sporadic and inconclusive. But we are a vast army of workers—all have personal experience of what we can and can not do.

If we as yet do not have the facilities to prove ourselves in the laboratory, we do have the material at hand to prove or disprove by the deductive method.

This means GET TOGETHER.

For example—I have ten cases of calcified subdeltoid bursae. I have used diathermy on these cases—some I have cured some I have not. My ten cases mean nothing, but amongst our membership there are many who have treated similar cases. We will say perhaps between us we could with a standard record obtain the findings on five hundred cases.

Some of our prescribing physicians have ordered other treatment for such cases—baking and massage, immobilization and hot packs, as many of us get the post-operative case. Which is the best procedure?

Now if we all kept a meticulous record of such cases, for instance, a record of the X-ray findings before and after three months of treatment, the history of the patient before treatment, the progress as to pain, use, etc., during treatment, the exact technique, i. e., the size of the electrodes, the placement, the machine used, the milliamperage, the number of treatments, the time of each treatment, etc.

Then we would have some valuable conclusions to draw concerning the treatment of calcified bursa. This is just one example in hundreds.

There is the vast field in orthopedics, the stiff joint, the arthritics, the infantile, the spastic, the hemiplegic, the peripheral nerve injury, the skin case, the medical case, the mental case, the postural deformities and the innumerable others that we are treating daily. We have here a wealth of material, but we are not exchanging our results. It is lying unused while we plod on using only our personal experience or the scanty literature on hand as our guide.

Dr. Watkins has suggested a method to not only lead us out of this wilderness but to present ourselves in our proper aspect before our employers . . . the medical profession. His message to us you will find in the PHYSIOTHERAPY REVIEW for August-September, 1930. —He says "If I were your autocrat, I should immediately appoint a committee to consider ways and means for making simple uniform record systems, systems that should be simply and easily filled out and as simply and easily indexed; and those systems I would have you individually and collectively keep up, with the same perpetual and desperate courage that you might be expected to employ to protect your honor"—and later he says "Who does only what he is paid to do, is paid only for what he does. This applies to you as truly as it does to me. To keep such records would entail some added work for which you would receive no remuneration. And yet there is a remuneration greater and more lasting than any material reward—It is the knowledge that in the great scheme of things you have done your bit; that you have woven your little individual thread into the vast fabric of scientific knowledge. That is your reward."

Dr. Watkins offered a prize of $125.00 to be doubled by the Association or anyone we could get to double that offer to make $250.00 for the best scheme in working out a simple adequate system for keeping and compiling such records. After discussion at the Annual Convention in Detroit, it was decided by that body to instruct the Executive Committee to appoint a committee which would have as its business the launching of a program to carry out the machinery of such a project.

This committee we will hear from soon. My purpose now is to put before you the necessity of such a project. We all want to bring Physical Therapy out of the realm of empericism. Perhaps this propect is our salvation.

H. E. F.

Where Physiotherapy and Education Meet

By Helen M. Moore, Physiotherapist, Weightman School, Washington, D.C.

On November 4, 1929, the District of Columbia opened two public schools for crippled children, one for the white and one for the colored children. At the Weightman School there are thirty-nine children, thirty-three of whom are receiving physiotherapy treatment. With one physiotherapist, the time for each child is limited. The particular point which has impressed me most is the extreme difficulty with which a spastic child transfers its improved condition from muscle training to the ordinary activities of life.

For instance a ten year old girl who was learning to walk had succeeded in walking over a block in one direction from the school, this route having been taken daily for several weeks because it was sunny. When the weather changed, and she was taken in the opposite direction on the same pavement with the same people, the usual nervous symptoms developed and she fell several times.

Apparently the constant repetition of the actual performance under any and all conditions is necessary before it is of much practical use to the child. This applies equally to dressing, eating, working or playing.

The teachers at the Weightman School have been most helpful in assisting and suggesting for this follow up work.

Miss Maitland, the teacher of the atypical class has kindly written the following article about her work:

FROM THE TEACHER'S VIEWPOINT

By Florence Maitland, A. M., Teacher

Past articles in the PHYSIOTHERAPY REVIEW have given help in the fine technique required in the treatment of cases of spastic paralysis. From the standpoint of muscle training Miss Moore asserts that nothing is to be added. She suggests however that the "household hints" given here may be of service to others with limited time and worry of follow up work.

The walking in the clinic is followed up by a strenuous five minute marching period in the classroom and on out into the yard to recess. Deliberate, careful transfer of training is provided for the peculiarity of each child.

The work on the stiff arm has amounted to ball games at recess, a row of children with a grown person or an expert catcher and thrower to stand in front to pass to each child, the child extending his arm overhead to toss the ball in return. They seem to enjoy this simple "toss and catch."

Another game used in the classroom is throwing the ball at a chalk marked circle on the blackboard. Hit the circle, score one and get another turn. Lining up to toss a bean bag into the waste basket also rates.

For the requested rhythmic work use the old "Here we go Lobby Loo" as good exercise and good fun.

"I put my right hand in,
I put my right hand out;
I give my right hand a shake,
Shake and turn myself about."

Then do a little chorus act and continue with the left hand, right foot, left foot, head and whole self. It proves to be a whole course. The music may be found in several old game books. The spastic version of the game is substituting sitting down for standing. Every day when rhymes are said just before story time, finger plays are in order. Again the old "Here is the church, here is the steeple, open the door and see all the good people" and "Here are my father's knives and forks."

Were there time in the clinic, it would be ideal for the children to dress and undress themselves. To keep the schedule this can't be done. Here the Montessori strips of buttons and button holes, hooks and eyes, and snap fasteners are serving as good material for a near approach to a life situation. The strips may be made about two or three feet long, six or eight inches wide with large buttons, hooks and eyes, and snappers sewed on firm cotton cloth. The physiotherapist can use these in the "in between" moments and the teacher can use them with the children at their desks. The lacing strip and stringing beads have been found less valuable than an equipment of old shoes and new shoe laces.

For free play material that mean fun to the stiffest little one, Patty Hill blocks are a boon. These are blocks of one, two and three feet in length, about three inches wide and an inch thick. Big posts for the corners of "buildings" come with these sets. Ends from the lumber yard augment the supply and big houses large enough for the children to walk around in are earnestly and joyfully built. A new lot of blocks, hollow wooden ones; three by eight by eleven inches are being made for a special group. These blocks will be big and also light.

Wrapping paper in long sheets tacked to the wall, paper the size of newspaper on the floor, also crates and great boxes furnish some of the supplies for painting. As the use of the old eight by eleven inch drawing paper has been scornfully discarded by the art departments of the progressive schools for normal children, so we no longer present our handicapped children with the material that "cramps the style" of the well child.

The Physiotherapist and the teacher of the atypical group have hammered away at the problems of appropriate follow up work for the spastic children. These have been some of the questions used to measure activity, or the effectiveness of the material and equipment used.

Are the muscles getting help?

(Spastic children with "scissors" gait are kept from walking on the balance beam.)

Is the handwork worth anything in itself?

Is the game or toy real fun to our children?

In the name of good muscle training and happiness these miscellaneous findings are offered.

Recreational Therapy

By Lorraine Frost

Recreational Therapy, as the name implies, is recreation which is planned and supervised from the standpoint of its therapeutic value. To the child it is "play"; to the physical therapist it is treatment. Due to its very nature, therefore, it must of necessity deal either with only one individual at a time, or with a small group of individuals of similar needs, depending upon the type of case. The field of Recreational Therapy is still so new that this article can do no more than suggest the various activities which a limited experience has found of value.

The Junior League Curative Workshop of Milwaukee, offering both Physical and Occupational Therapy to the handicapped child, believed that some additional and less arbitrary form of treatment, in which the child could at the same time play, had possibilities in the treatment of almost all cases.

Probably the child with spastic paralysis offers the greatest opportunity along this line. In most cases of this type it is desirable to work with the individual, although gradually it may be possible for the less severe cases to join a small group. Since much of the emphasis here is to be placed on relaxation and on rhythm, music is an invaluable asset. For this only the most simple rhythms in relatively quiet, legato music are used. Slow, rhythmic clapping and tapping may precede practice in walking to music with an even gait. In cases of severe leg involvement a walker may be necessary. If concentration is difficult, the child's attention may often be held by walking to simple singing games, such as "This is the way my dolly walks—," or folk dances. All children love to skip, and, where possible, this may be taught, the child first learning to hop on one foot, then to step-hop on alternate feet, and finally to skip to music.

In cases of hand and arm involvement finger plays offer practice in the finer coordinations of the hand and fingers, and appeal to the imagination of the child. Assistance will often be needed in using the separate fingers at first, but gratifying results may be obtained with perseverance.

Story plays may be specifically adapted to the individual need, e. g., for cases of upper limb disability such a one as BUILDING A HOUSE,—digging the cellar, sawing boards, hammering nails, and painting,—is very good. Likewise, if the need is for leg coordination such an action play as THE FIREMEN, which includes the motions of climbing a ladder, may be used.

Singing games and folk dances are useful in developing coordination in children of all ages, as they range from the simple "Clap, clap, bow," of the Danish Dance of Greeting to the most intricate Scottish Highland Fling, which even the normal boy or girl has difficulty in executing. In many cases slight changes from the original are desirable. The toe-pointer element common to most dances must usually be changed to a heel-touching, in order to obtain the necessary dorsi flexion. Likewise, walking may be used instead of skipping, where the latter is impossible.

Games in which a ball is used are very valuable. The size of the ball may be varied. Progression is easily planned—(1) simple holding of a ball, demanding a primary relaxation of the fingers and thumb, with a subsequent flexion for the grasp; (2) throwing the ball, in which it is usually desirable to insist upon an overhead throw rather than a toss, for the reach upward and the extension of the elbow and wrist, as well as, of course, the sudden extension of the fingers at the end; (3) catching a ball, which is more easily done if a large, not too heavy, ball is used at first; (4) throwing at an object, such as an Indian Club, which demands further coordination in the aim; (5) bouncing the ball and catching it; (6) playing jacks, a game which girls especially enjoy, and of which the elements can be separately taught.

Group games may at times be used. Here it is usually desirable to choose games which have little possibility of being exciting, for it is true that a game which may have no such element for the normal child may produce an undesirable state of nervous tension in the spastic. At the same time, a game which demands a relatively quick response is of value in developing coordination. Mimetic games, such as "Did You Ever See a Lassie?" are both popular with the children, and good from the standpoint of coordinated and rhythmic action. Nor should accuracy be entirely disregarded. The child should be urged, and helped if necessary, to perform the action as well as possible. The development of the habit of accuracy, in so far as possible, would be of the utmost value in the future life of the child.

The potentialities in the case of the child with residual muscle weakness from poliomyelitis are perhaps not quite so great. However, here again we may see that the child gives the affected part the needed exercise, which, as always, must be moderate. For example, the children are playing "The Shoemaker and the Elves." The shoemaker, reaching up on the shelf for a pair of shoes, uses his good arm, by force of habit. Reminded, he raises his weak left arm up, nor is there danger of fatigue in one such isolated action.

In general the same groups of plays and games may be used as in the case of the spastic, varying in detail to fit the needs of the individual case. For hand cases finger plays are valuable. Story plays may be planned to give the necessary exercise. Care must always be taken that the child does not try to hold one position too long. Folk dances may be used to advantage. Here again heel-pointing is more often necessary than toe. Skipping is often better changed to walking, or even to simple clapping, if the leg involvement is too great. The child doubtless runs and skips, after a fashion, in his ordinary play life, and there is no special value to be derived in these cases from doing this under supervision.

Marching to music, with emphasis on the correct position of the feet, is valuable training. In cases of extreme paralysis, the walker has been found useful. Since this removes part of the body weight, the child can walk in a much better position. Daily practice in this would seem to promise results, both physically, and from the standpoint of habit formation.

Games have a more specific value in hand and arm cases than in those of leg weakness. Here again games using a ball or beanbag are useful.

In cases of obstetrical paralysis ball games are im-

portant. In throwing the ball from an overhead position the arm is raised as much as possible, and in tossing with an underhand throw supination is demanded.

The third large group, namely, posture cases, also offers opportunity for beneficial results along this line. Marching with good posture may be varied to hold the child's interest, e. g., stretching tall, high-stepping horses, soldiers, using wands as guns. Mimetic wand exercises to music have been found of value, and children enjoy them. Story plays may again be used, e. g., Going to the Circus, in which the child may be the giraffe, the trapeze walker, etc. Folk dances, such as The Sailor's Hornpipe, or Jump, Jump, Jim Crow, are good to include.

It is in this group that stunts have their place. Badger Pulling, in which two children, facing each other on their knees, a single band or belt around their necks, on a given signal pull in opposite directions, is excellent in strengthening the posterior neck and upper back muscles.

It is difficult to find games for a small group and limited space with an obvious posture value. Such a relay as the one in which the players carry an object on their heads is useful. It is also possible to make some very simple games of benefit to the individual case. For instance, the child with a left total curve, in playing the game in which he tosses a ball into a basket on the floor, can be reminded to do so with his left hand, which may somewhat impair his skill, but will produce some straightening of the curve.

In all types of cases—spastic, infantile, and posture—one result is to be observed in common. The majority of children seem to develop a certain amount of poise and self-confidence, which is worth a great deal.

In dealing with cases from the recreational standpoint, it is not difficult to see how necessary is an intimate knowledge of each individual disability. This therefore necessitates a person in charge who not only understands the teaching of games, etc., and playing with children, but has also an intelligent understanding of pathology and treatment.

It is true that the child spends much of his time at home in play. However, as he doubtless habitually favors the affected part, that does not preclude the good which may be accomplished by play supervised from the therapeutic standpoint, in which the little arm or leg is given specific, voluntary action.

Abstracts

By John S. Coulter, M. D.

Whirlpool Baths and Posterior Splinting to Overcome Contractures in Burns. J. W. Hilbert, M. D., South Bend, Ind., in Jour. A. M. A., 95:14:1021, Oct. 4, 1930.

Contractures occurring secondary to burned areas about a joint are always problems of considerable magnitude, especially when the disability and compensation factors are taken into consideration. Many methods have, in the past, been used, such as open method with extension and weights, paraffin method and sand bagging, all of which have caused considerable pain to the patient and many of which had finally to be discontinued either because of the discomfort or because they were not practical over a long period of time.

I report this case merely because, as far as I can discover, the method used is unique, is easily carried out and gives excellent results.

July 8, 1930, a white man, aged 24, sustained extensive second and third degree burns to both extremities from the ankles to the middle third of the thighs. The whole circumference of both limbs was involved. A thick application of ointment dressing was applied and the patient removed to the hospital. Within 24 hours the patient presented a toxic picture with chills, fever and rapid pulse; he became delirious; the urine showed albumin, much pus, granular casts and blood. The routine procedure of relieving the kidneys was followed with normal response, but by the fifth day sloughing of the burned areas and purulent secretions became very extensive. Because of the pain associated with the dressing and cleaning of the parts, the patient's extremities were subjected to whirlpool baths, at a temperature beginning at 100 F., and increasing to 110, for ten minutes. This not only took away all secretions and the major portions of the sloughs but also affected a stimulating massage. On the seventh day the first evidences of contractures became manifest and within twenty-four hours there was right angle flexion of the limbs at the knees. Two light weight but strong veneered boards were designed so as to extend from the patient's heels to just below his buttocks. These were tapered from 2½ inches at the distal end to 8 inches at the proximal extremity. After padding with cotton and covering with gauze the splints were placed, one posterior to each limb and 2 inch gauze ties were used as an anchorage at the ankle and at the middle third of the thigh. By this method the weight of the limb, after twenty-four hours, overcame without pain to the patient almost all of the contracture at the knees, so that the 8 inch distance from the splint to the popliteal space on application of the splint was reduced to 3 inches in one day's time. In another twelve hours the legs were fully extended and the splints were removed. After three days there again appeared some flexion, but this was readily overcome by reapplication of the splints for a period of another twenty-four hours. Whirlpool baths followed by water cooled ultraviolet irradiations were continued daily to July 24, at which time this procedure was done every second day until August 8. After six weeks time the patient has but a few denuded areas on each leg, which are rapidly filling in with healthy epithelium. He walks normally, without pain; he can flex and extend both limbs normally and will have no permanent impairment.

The Rational Treatment of Hypertension. Soma Weiss, M. D., and Laurence B. Ellis, M. D., Boston, in Jour. A. M. A., 95:12:846, Sept. 20, 1930.

Among other things the author notes that it is advisable to avoid the patient's concentrating attention on the level of his blood pressure. Anxiety induced by "blood pressure phobia" often is responsible for further accentuation of arterial hypertension.

It is necessary to rearrange the life of the patient in such a manner that he may learn to relax. Strenuous sports, such as tennis, swimming or squash, should be avoided. Mild sports in moderation may, on the other hand, be very beneficial. Exercises in general are harmful.

No special diet has proved of definite value. The use of tobacco is not generally contraindicated in arterial hypertension. The bowels should be kept free and daily action without strain assured.

The beneficial effect of balneotherapy is through its action on the central nervous system. The baths should be moderately warm and not below 34 C., for baths below this temperature elevate the blood pressure.

Foci of infection should be searched for and eradicated.

Orthopedic Aspects of Chronic Rheumatism or Arthritis. Robert Bayley Osgood, M. D., Boston, in Jour. A. M. A., 95:14:992, Oct. 4, 1930.

Prevention of Deformity and Maintenance of Joint Motion.—If a joint threatens to become permanently stiff in spite of treatment, the optimum functional positions of ankylosis must be kept constantly in mind.

Local Treatment of Joints.—The primary object of local treatment of the affected joints should be to increase their blood supply. Heat in its various forms of application, massage, and voluntary exercise, stopping short, of course, of irritation of the joints; in other words, intelligent physical therapy, often attended by its useful handmaiden occupational therapy, relieves pain and improves function.

Sensitive weight bearing atrophic joints tending to contractures may with advantage be supported by light apparatus in order to allow painless and nonirritating functional use so important in combating the atrophy of nonuse. A word of caution may be given here concerning too complete and too continuous fixation of joints in the atrophic type. Adhesions are prone to occur and atrophy increases very rapidly. A little pain is the lesser evil.

Protection by apparatus to sensitive hypertrophic joints is always grateful to patients and often relieves them of all discomfort. There is no danger of ankylosis in even completely fixing these joints for several days.

There is no specific drug or vaccine for all cases of either type. There are many different drugs which are useful.

The surgery of chronic arthritis is patchwork surgery. Little is to be hoped from surgery while the disease is active. When the disease has been arrested, surgery may restore large amounts of function.

A Synopsis of the Treatment of Chronic Arthritis. George A. Williamson, M. D., Saint Paul, in Minnesota Medicine, xiii:10:708, October, 1930.

In both types of arthritis, the treatment must be initiated by a thorough examination of the patient. Focal infection in teeth, tonsils, sinuses, prostate and bowel are carefully searched for and, if found, are eliminated as thoroughly as possible. Postural defects or other indications of faulty body mechanics should be remedied by the use of supports and supervised exercise.

The abnormally low basal metabolic rate present in 39 per cent of cases, according to Swain and Spear, is treated with Lugol's solution or thyroid substance, and the lessened sugar tolerance found by Pemberton and others, is favored by the low carbohydrate diet. The various drugs in use are too numerous to mention.

Heat is a boon to all arthritics. Best results have been obtained by the use of cabinets, or electric cradle baths, which, by their diaphoretic action, assist the general elimination. Local heat to the affected joints, by the use of the electric baker, infra-red lamp, or diathermy helps to relieve the pain and diminish the swelling.

One other very important measure is the use of foreign protein reaction produced by the intravenous administration of triple typhoid vaccine as suggested by Miller and Luck. The method of administration is very simple. Beginning with 0.5 min. of triple typhoid vaccine (Minn. State Board of Health) intravenously, the doses are gradually increased 0.5 min. at a time, until 2 min. are given. Doses are given five days apart and in courses of five or six. The patient should be kept under observation as the reactions are sometimes very severe.

The question of the prevention of deformities is one of prime importance, particularly to men in general practice.

It is essential in joint disease to be aware of the possibility of ankylosis and, if this condition is to develop, to hold the joints in the position of optimum function.

For the shoulder the position is one of 75 degrees abduction and 15 degrees of forward flexion with the palm of the hand directed toward the face. If one elbow is involved it should be held at a right angle in the case of a man, and below this point if the patient is a woman. If both elbows are involved one should be held below and the other above a right angle. The wrist should be held in the more powerful grasping position, slightly hyper-extended. The hip is best if it is held abducted, externally rotated, and flexed a few degrees while the knee is best if held flexed 5 to 10 degrees.

With the subsidence of pain and tenderness, the joints should be baked and moved gently both actively and passively. Pump-handling stiffened joints does much harm by producing denser adhesions in response to the vicious irritation.

Thickening of the synovial membrane with formation of villous processes which project into the joint spaces is frequently found in chronic arthritis.

Excision of these fringes, as much of the synovial membrane and as many osteophytes as can be reached, or removal of loose bodies, is accompanied by marked relief. A careful and thorough synovectomy is followed by a short period of rest until healing has taken place before vigorous physiotherapy is instituted. The physiotherapy referred to is chiefly active motion of the joint by the patient's own efforts but not to the extent of producing irritative symptoms.

A patient who is willing to cooperate in the treatment of his disease need have no fear of a stiff joint following the above mentioned operations.

As regards the correction of deformities in joints which are completely ankylosed, the methods to be used depend upon whether a movable joint, or a fixed joint in good functioning position is to be the object attained. Many operations have been described for the production of motion in ankylosed joints.

Some of the most recent work upon the problem is the sympathetic ganglionectomy introduced by Rowntree and Adson in 1927. The work is highly experimental and remote results have not been observed. Changes in the extremities are chiefly due to the increased blood supply following the abolition of the vasomotor influence on the blood vessels.

Shoulder Pain—A Consideration of Some Easily Overlook Causes. Alexander Gillies, M. B., F. R. C. S., Ed. Dep't of Orthopedic Surgery, Lockwood Clinic, Toronto; in Can. M. A. J., xxiii:3:402, September, 1930.

A muscular condition which is often overlooked is strain of the rhomboideus minor muscle. Pain is experienced in the interscapular region when the arm is used in abduction. On physical examination a tender area, distinctly localized and about the size of half a dollar, is found just mesial to the base of the spine of the scapula. On putting the arm through its range of abduction, no pain is experienced until the ninety degree point is reached, but as the movement is continued beyond that aching at the point of tenderness becomes increasingly severe. The condition responds favorably to fixation of the scapula with adhesive tape after it has been drawn back as far as possible toward the middle line.

Rupture of the supraspinatus tendon commonly takes place at its insertion into the greater tuberosity. For long it has been known that shadows in this area may disappear, particularly when diathermy has been given. This behavior is to be expected from fat more than from calcium deposits.

Subdeltoid bursitis actually exists. In the treatment of this condition in the acute stage, the arm is abducted from the side, either by a splint or by the use of an axillary pad. Frequently abduction may be obtained by tying the wrist to the top of the bed, giving ample support to the back and arm by pillows, and by raising the head of the bed, so that while the arm is stationary the body tends to gravitate away from it. After the acute stage has subsided, light massage, diathermy or other forms of heat and passive movements should be used. Following this, resistive exercises for the improvement of the shoulder muscles should be instituted. Manipulation under anaesthesia should be resorted to in cases of adhesions following long standing abduction of the arm to the side, and where passive motion is restricted. More recently in cases of sub-deltoid bursitis x-ray dosage has been employed by some with reported success.

Synovitis of the shoulder-joint when present in a mild degree is not easily detected.

Intra-articular adhesions are especially likely to occur if the shoulder is left too long at rest in the abduction position following acute lesion or sprain. Limitation of abduction and rotation becomes marked, necessitating manipulation under anaesthesia.

The result of such manipulation depends first on the existing condition and secondly on the technique. Where adhesions are general, it is at the same time necessary and safe to multiply the number of manipulations, being

content with small gains at each session and not risking the addition of a fracture to the existing disability.

Physiotherapy In Chronic Abdominal Conditions. Russell S. Boles, M. D., Associate in Medicine, Univ. of Pennsylvania, Philadelphia, in Internat'l J. M. & S., 43:8:424, August, 1930.

Irrigation of the Colon.—There had never been any experimental work done to demonstrate the actual efficacy of this form of therapy until the present year, when Garbot and Jacobi of the Lennox Hill Hospital in New York showed that they could secure a stimulation of secretion and the expulsion of bile from the gallbladder by the injection of various solutions high up in the lower bowel. I believe this is an important progressive step in the treatment of biliary and intestinal stasis.

Colonic irrigations I would unquestionably regard as efficient and practical aid in the relief of stasis in the intestinal and biliary tracts, provided of course, that they are properly administered. I do not believe they cure anything, and I cannot too strongly condemn the indiscriminate and promiscuous use of them outside the profession.

Massage, electrotherapy, hydrotherapy, helio-therapy and the ultraviolet ray and other physical measures enjoy a distinct field of usefulness. A keener appreciation of their value will best be attained by a strictly impartial but critical analysis of the claims made for them.

Chronic Irritable Colon. L. J. Steiner, Detroit, Mich., in Jour. Detroit Col. M. & S., 1:2:54, July, 1930.

Treatment.—All foci of infection, especially in the teeth, sinuses and tonsils should be eradicated as soon as possible.

The food must meet the caloric requirements of the individual. The presence of other diseases such as ulcer, diabetes or nephritis requires special modifications. A sufficient amount of water, should always be taken—hot water especially on rising in the morning. A bland diet (with the full directions) should be given to the patient. The bland diet, with instructions, as used by the medical department of the Henry Ford Hospital is reproduced in full.

Hot baths and hot applications are valuable in relieving spasms. A moderate amount of exercise is advisable. Light massage and the galvanic current are helpful in the treatment. Visceroptosis should be corrected by means of an abdominal support.

Oil retention enemas at night followed by a simple tap water enema in the morning may be used in the beginning of the treatment. These should be dispensed with as soon as possible. If there is much toxemia, colonic irrigation at a temperature of 104 F. can be used for a short period of time. This should never be used over any great period of time.

If the protein of the diet is withheld, the bacilli of the acidophilic type may be successfully implanted and be caused to predominate in the intestinal tract. It is of great importance in this respect, to be sure that plenty of lactodextrin is given with each meal.

Antispasmodics, such as belladonna, should be given. The bromides, atropine, hydrastis, eumydrin are also very useful.

Deficiencies in endocrinal secretions should be corrected by suitable glandular substances.

Psychotherapy is of great importance. The patients should be assured that no organic cause for disease is present. They should be taught to live regular hours, to avoid fatigue and to relax.

The Prevention and Treatment of Infantile Eczema. Donald C. Mebane, M. D., Toledo, in Ohio State M. J., xxvi:9:834, October, 1930.

Ultraviolet light is of definite benefit in early cases of eczema. When given in low dosage of less than the erythema dose itching is relieved, the skin condition improved and development favorably influenced. In severe cases by this measure moist eczema and infected eczema are benefited as are complications such as otitis media and pyelitis. Huldschinsky advises ultra violet in infantile eczema (Huldschinsky, Klin. Wchnschr., page 71, Jan. 8, 1929).

One of the most important recent developments especially from the pediatric standpoint is that of irradiated ergosterol. Heretofore in early infancy in order to prevent rachitis large doses of cod liver oil have been necessary. In many instances this high caloric fat has been sufficient to upset the digestion and metabolism and initiate eczema. In some cases it used to be necessary to stop cod liver oil or cut down the amount with the result that while the eczema improved, rachitis developed. At present with viosterol the dose is so small that it is never necessary to discontinue it even in illness. After five months of age usually a sufficient dose of cod liver oil can be given without upsetting digestion and producing skin irritation provided it is replaced by viosterol if indisposition, illness or skin irritation occurs.

SUMMARY

Sufficient fluid intake beginning from the time of birth is exceedingly important if infantile eczema is to be prevented.

Special attention to water intake, diet regulation and treatment must be observed to prevent skin irritation during infections.

There is a noticeable connection between infantile eczema and the acid-base equilibrium in infancy. Where alkalinity cannot be maintained by dietary measures the proper use of alkaline drugs is beneficial.

Cathartics are to be avoided in infancy.

Viosterol has distinct advantages over cod liver oil. Its discovery is an important advancement and its use is vital in the prevention and treatment of infantile eczema.

Acidified milk often initiates an infantile eczema. The well-balanced diet sufficient in principles, high enough in calories to bring about an average gain in weight and with added food accessory factors is fundamental.

Chilblains: Their Treatment by the Melted Paraffin Wax Bath and Ultraviolet Rays. F. Howard Humphris, M. D., in The Practitioner, cxxv:4:531, October, 1930.

In the treatment of chilblains, the aim of local treatment is to stimulate the peripheral circulation and to strengthen the superficial capillaries, and the two means which are offered by present day physiotherapists, which produce an increase in the peripheral circulation lasting some hours, are the melted paraffin wax bath and ultraviolet rays.

The patient remains with his hands or feet in the bath for about twenty minutes, at a temperature of about 120 to 130 F. The sensation is usually quite comfortable. At the end of this time the part under treatment is removed from the bath and allowed to cool. After two or three minutes the wax can be quite easily pulled off the limb.

It may be asked, would not the same heat applied through a water bath have the same effect on the capillaries, and the circulation generally? The answer is that the same heat cannot be applied through water, since the highest temperature admissible in the water bath is

105 F. to 110 F. Paraffin wax, in the state of oil which it assumes when heated, is a much more feeble conductor of heat than water. Weber estimates the relative conductivities of oil and water as 0.003 and 0.001 respectively, in other words, water conducts three times as well as oil, or that oil is a much gentler heating agent, and therefore a higher temperature can be borne through it.

Atonic Ulcers. Here the ultraviolet rays are the most useful. The daily application of a mild dose of the rays soon stimulates the sluggish ulcer and promotes healing, and then the cure proceeds as in the unbroken variety.

A second degree plus or a third degree minus erythema should be produced. The treatment should be repeated when the erythema has subsided. The good effect of the local treatment is greatly enhanced by the administration of the general body light bath twice a week.

The Treatment of Infected Wounds On a Surgical Service. Allen B. Canavel, M. D., F. A. C. S., and Sumner L. Koch, M. D., F. A. C. S., Chicago, in Bull. Am. Col. Surg., xiv:3:19, September 1930.

One can hardly dismiss the subject of warm moist dressings with the statement that they afford the most effective method of producing local hyperemia. To be continuously effective wet dressings must be kept warm and at the same time the patient must not be required to lie on wet sheets and a wet bed. The usual technic of applying warm moist dressings consists in wringing out hot cloths in a hand roller and applying them with bare fingers to the area to be covered. There are three very definite objections to this method: It is wasteful of dressings; it furnishes frequent opportunities for secondary contamination of the wound; the dressings remain warm for only a brief interval.

If the dressings are changed every three or four hours, during the greater part of the time they are cold and wet, they are irksome to the patient and they may actually lower the vitality of the tissues by reason of the lowered temperature of the part caused by rapid evaporation of the moisture from the wet dressing.

We believe as a result of long observation that one must depend on an external source of constant and unvarying heat, if he wishes actually to keep a dressing moist and warm. This can be accomplished by putting a large sterile dressing about the affected part, moistening it—not saturating it—with a warm sterile solution, such as boric or salt solution, or plain sterile water, and suspending over it a powerful light which is covered with a cone-shaped canvas cover so as to concentrate the heat over the affected part and prevent the access of drafts of cold air. Every two hours the outside covering of the dressing is opened just enough to permit moistening it with the warm solution, and the light is replaced. Equally satisfactory is the so-called electric oven or baker which can be placed like a cradle over the affected part and which has the added advantage of not disturbing the patient with light rays.

Once in 24 hours the dressings are completely removed and replaced by fresh dressings with the same careful attention to aseptic technic as when the original dressing was applied.

Photosensitivation. Clauss Burkart Strauch, M. D., Milwaukee, in Amer. J. Dis. Child., 40:4:800, October, 1930.

It has been tried of course, to utilize this possibility in medicine. Especially eosin, which is of value in sensitivation in photography, was used in weak infants to increase the reaction to light, either given by mouth or used as an ointment applied to the skin during treatment with sunlight. French authors report sensitivation toward ultraviolet light rays by means of intravenous injections of acriflavine hydrochloride (trypaflavine). An extreme degree of light sensitiveness has been produced by Meyer-Betz on himself after an intravenous injection of O. 2 Gm of hematoporphyrin dissolved in 10 cc. of tenth normal sodium hydroxide with the addition of a 300 cc. of physiologic solution of sodium chloride. Exposure to moderately bright sunlight for 10 minutes brought about an erythematous edematous reaction, such as ordinarily seen after hours of exposure to the sun on glaciers. The lasting effect of the one injection was apparent after months by increased formation of pigment after each exposure to the sun.

The effect produced by injections of hematoporphyrin that was made from hemin according to the method of Willstatetter and M. Fischer was very distinct, however.

SUMMARY

Photosensitivation permits increase of the reaction of the skin to sunlight.

Hematoporphyrin is superior in this respect to other substances.

Severe sunburn may result in persons made sensitive.

Photosensitivation may compete with ultraviolet irradiation in the prevention and cure of rickets.

The Phototropy of Ultraviolet Transmitting Glasses. Lyman Chalkley, Jr., New York, in Science, lxxii: 1858:143, August 8, 1930.

Two years ago when the Boyce Thompson Institute entertained the local sections of the American Chemical Society, I noticed that a sheet of ultraviolet transmitting glass, said to be Corex, which had been used in a hot bed frame and exposed to a mercury quartz lamp, showed a distinct pinkish brown tinge. A piece of the same glass, exposed also to a mercury lamp and in addition to sunlight, showed no coloration whatever and had remained perfectly colorless.

This suggested that Corex was phototropic, and that the longer wave length light supplied by the sun tended to reverse the colorizing action of the mercury lamp.

This supposition has been confirmed by more recent observation. Wood and Leathwood (Nature, 124:441, 1929) determined quantitatively that ultraviolet transmitting glasses which had been colored by exposure to a mercury lamp were completely restored to their original transparency by exposure to sunlight. Shrum, Patten and Smith and Nitchie and Schmutz have shown that the color produced by mercury lamp solarization can be completely destroyed by heating the colored glass. Clearly, then, the colorization action of short wave-length light is reversed by longer wave-length light and by heat. That is, the phenomenon is one of phototropy.

The purpose of this note is to draw attention to the striking similarity between the behavior of ultraviolet transmitting glasses and the more extensively studied though little known phenomenon of phototropy. It is thought that the history of lithopone and other phototropic substances may be useful to those who have occasion to handle these new glasses and who may wish to control the solarization effects either in manufacture or in use.

Instruments for Measuring Ultraviolet Radiation and the Unit of Dosage In Ultraviolet Therapy. W. W. Coblentz, Washington, D. C., in British J. Radiol., iii:32:354, August 1930; abstracted from Symposium on Ultraviolet Therapy II, Medical Journal and Record.

In conclusion, it is relevant to emphasize that the sta-

tus of the question of measuring the dosage, and the value of the unit of dosage is decidedly unsatisfactory. In order to make progress in standardization it seems desirable to have general agreement as to the therapeutic effect at a given wave-length, in order that, if possible, the wave-length sensitivity curve of the measuring instrument may be made to coincide with the biological effect. Furthermore, the sources of ultraviolet differ so greatly in the spectral quality of the radiation emitted that some specification may be necessary involving the "rubescence" curve, i. e., the physiological response, obtained for an equal energy stimulus of different wave-lengths, multiplied by the spectral intensities of the particular source used. In this connection it will be necessary to correlate the therapeutic action with the energy value of a highly activating monochromatic radiation stimulus, emitted by some standard source, for example, the wave-length 297 millimicron or 302 millimicron, emitted by the quartz mercury arc lamp.

From the foregoing comments it will be evident that much remains to be done in order to obtain a uniform system of phototherapy so that practitioners may work under the same conditions and thereby obtain more uniform results. The most important problem is to secure a simple method of evaluating the light stimulus, on a reproducible basis, that can be used by all.

Experiences With Artificial Heliotherapy. An abstract. Henry Stuart Willis in Bull. Johns Hopkins Hosp., xlvii:3:186, September, 1930.

In the first place the treated group of patients with adenitis (mostly tuberculosis) showed improvement in general. Several individuals of this group showed a remarkable degree of improvement. This was particularly true in those who had a sinus tract.

Secondly: A large percentage of the treated patients experienced a definite tonic effect in the way of subjective well being, improvement in appetite and increase in weight. This was not a feature in the control group.

Thirdly: Pigmentation seemed to depend upon the size of the initial or early doses and the rate of increase of exposure (i. e., on the degree of erythema). In appeared to have nothing to do with the degree of improvement or lack of improvement. There was no material difference in response among white and colored people.

Fourthly: Plate glass screens out the short ultraviolet waves—those which produce pigmentation and those which are specific in preventing and curing rickets—but it transmits the longer ultraviolet waves, the visible waves and some of the infra-red waves. The effect of these waves upon disease is entirely unknown and should be studied. It is planned to run a third group of control patients who do not get these waves.

Finally: It should be noted that these are impressions only, and not conclusions, that the few cases studied do not represent a cross section of disease as it is seen in our dispensaries and that much more must yet be done on the question before definite conclusions are forthcoming. We have not studied many of the cutaneous diseases, granulating wounds, etc., which are said to respond favorably to ultraviolet light treatment.

The Limitations of Heliotherapy in Pulmonary Tuberculosis. Bernard Langdon Wyatt, Tucson, Ariz., in Annals of Internal Medicine, 4:4:376, October, 1930.

It was clearly demonstrated that, when carefully supervised, general irradiations do not tend to produce hemoptysis, but it was necessary to be constantly on the alert to keep the exposures below the point of stirring up focal reactions.

There are some indications that a few patients with chronic fibrosis might be benefited by indirect irradiations from sky reflection, but it was obvious that direct heliotherapy had definite dangers unless properly supervised.

It was furthermore found that the mathematical precision with which attempts were made to measure dosage was impracticable, as well as unnecessary, and that a considerable variation in the amount of solar radiations was tolerated without any clinical manifestations whatever.

The results derived from direct heliotherapy in pleural tuberculosis was most gratifying, and this was also true of tracheo-bronchial lymphnode diseases. Furthermore, it appeared that exposures to the direct rays of the sun were of great value in preventing the development of intrapulmonary lesions in cases of hilum tuberculosis and primary pleural development.

Sunlight which was formerly used extensively in Switzerland for the treatment of pulmonary tuberculosis, has been given up almost completely, and Jacquerod, after many years' experience with several thousand patients, has discarded it entirely.

Heliotherapy and the Peripheral Blood. Gerald Hoeffel, M. D., and Dorothy Lyons, A. B., Boston, in Amer. J. Dis. Child., 40:3:484, September, 1930.

In presenting the figures obtained from our observations on the blood, we have pointed out that there are many factors that must be considered in interpreting the results. In the first place, there is the diurnal fluctuation in a person. It is not uncommon to find a child who shows a variation of from 5 to 10 points in the percentage of hemoglobin between the morning and afternoon estimations. We wonder if this tendency has been appreciated in general, and particularly by the observer who is attempting to draw conclusions from studies of the effect of heliotherapy on the blood. Also to be considered are the effect of food, fluid intake, physical activity, season of the year and any other stimulus or irritant.

In an endeavor to identify an influence that any of these factors might exert, we made observations on a few children at frequent intervals during the day, carefully noting just when these various agents came into play, i. e., blood was taken before breakfast, after breakfast, before, during and after exposure to light, during the rest hour, and so on, throughout the day. From all this maze of data we were unable to isolate any reaction in the blood picture that might be attributed to any of the aforesaid influences, either singly or collectively. All these factors come into play in the child's daily routine, and to try to single out cause and effect is impossible.

Again, as the observations from period to period are compared, there are at work other influences beside the amount of ultraviolet rays available that may produce a change. Here we must consider a local reaction to the disease process, its effect on the general constitution, the existence of times when current infection is being incubated or aborted or exists as a definite process; the presence of external irritants, which would include stimulation from many of the rays in the full range of the solar spectrum, and, finally, the physiologic change occurring as the result of age and physical development.

CONCLUSION

There is no justification for the belief that light rays, considered either collectively as including the entire spectrum or individually as ultraviolet rays, have any specific effect on the blood.

The effect of light on the healing of a pathologic

process, such as tuberculosis, cannot be distinguished from that exerted by other factors, the beneficial influences of which are well recognized.

Further Observations on Control of Common Colds by Ultraviolet Rays. George H. Maughan, M. A., B. S., Ph. D., and Dean F. Smiley, B. A., M. D., Cornell University, U. S. A., in Brit. J. Actinotherapy, v:6:115, September, 1930.

In our work with this problem we have, during the past winter, operated a "solarium" in which 60 or more students could obtain irradiation per hour. There were about 300 men receiving regular treatments. One set of 50-inch mercury vapor lamps (Corex D tubes, 15 in number) were arranged in such a way as to expose 15 men at a time. An automatic clock gave the signal each minute and a new student entered and one left the maze at each signal, while each man shifted one place. Each man, therefore, had 15 minutes total irradiation. (It should of course be understood that this total was not reached until individuals had been submitted to several irradiations of gradually increasing length.)

The results of the present year's work indicate a reduction of 58.8 per cent in the number of colds among the irradiated cold-susceptible men as compared with the non-irradiated groups. In addition to the ultraviolet irradiations, the irradiated students were given alkali powders containing equal parts of sodium bicarbonate and magnesium carbonate whenever any cold was reported.

Where Sun Cure and Work Cure Are Successfully Combined. Dr. A. Rollier, Medical Director, Heliotherapeutic Clinics, Leysin, Switzerland, in Modern Hosp., xxxv:4:55, October 1930.

Our patients, most of whom had surgical tuberculosis, began by making simple articles, such as string bags, hammocks, rugs, baskets and carved wood ornaments, since the facilities were at first, of necessity, makeshift, and the difficulties of sale great. This work developed so rapidly (more than 80 different kinds of articles were made) that the workshops were soon inadequate, and an annex for convalescents was built, containing large workshops where they could work at ease in spacious sunny balconies or indoors if the weather was bad. The salary of the workman was based on the difference between the sales price and the cost of materials after a deduction of 10 per cent was made for the upkeep of tools and machinery and for a special monthly payment for comrades too ill to work.

Certain patients, such as those suffering from tuberculosis of the spine, can easily work in the ventral position without interfering with their recovery. With a cushion under the chest and the elbows on the mattress, the hands are left free and the patient can use them during the long hours when the back and body are being exposed to the sun. A special arrangement allows the invalid with tuberculosis of the hip to work on his back without moving the coxo-femoral joint.

The work cure has not only proved an important therapeutic factor, but has also brought considerable financial assistance to our patients. During the year 1918-19 alone, the Swiss Soldiers Cooperative of Leysin sold goods valued at frs. 62,190.

Our international factory clinic, which was opened on February 1, 1930, contains 120 beds, combines the facilities of a model clinic and a model factory.

Here, patients suffering from surgical tuberculosis enjoy the advantages of an improved modern technical organization that allows them to earn part of their upkeep by doing industrial work that is easy, hygienic and remunerative.

The Conservative Treatment in Surgical Tuberculosis of the Lower Extremity. Dr. A. Rollier, Leysin, Switzerland, in Journal of Bone & Joint Surg., xii:4:733, October, 1930.

In recommending general heliotherapy, I insist that the rational exposure to light is furnished to us by the complete solar spectrum; for I consider that the latter is inseparable in its nature. It cannot be too frequently repeated that the entire spectrum must be applied to the entire area of the skin. One of the reasons that led me to recommend complete insolation was my conviction, which has grown constantly stronger, that the skin plays a role of capital importance in the general economy. Heliotherapy exercises a definite restorative influence upon the muscular system, and the restoration of the latter is no less important than that of the skin in the defense of the organism against tuberculosis.

I have at my disposal a collection of more than 60,000 radiographic negatives, in which one can follow in all its details the action exerted by general heliotherapy upon every bacillary localization of osteitis and osteocarthritis, and even demonstrate the recalcifying, cicatrizing, and restoring influence. However, in order that heliotherapy may exercise its maximum effectiveness, it is necessary that it should be practiced according to certain principles of dosage and of exact technique.

There are certain distinctive radiological signs in connection with the three joints of the lower limb, and with the action that heliotherapy exerts upon them.

Hip Joint.—The synovial form of disease in this joint is rare, and is almost always the result of an unrecognized subchondral focus. Foci outside the joint are uncommon, and their prognosis is favorable like that of synovitis.

Knee.—The foci, both in the adult and in the child, have a more marked tendency to recovery than the synovial forms in which recovery is slower. In the healing of the knee, there is seen especially a formation of thick trabeculae, a sign of intense recalcification.

Foot.—The tibiotarsal joint is, above all, most favorably influenced by heliotherapy.

It should be mentioned in passing that I attach great importance to the diet of patients, the diet being adapted to heliotherapy. A rational diet ought to be composed above all of those articles,—such as cereals, vegetables and fruit—which are rich in vitamins and in remineralizing substances, and which are comparable to the action of the sun. They are the irradiated foods par excellence.

To this program of a physical character (aero-heliotherapy, orthopaedics, and rational diet), it is indispensable to unite another factor, the morale. This is the object of the work cure that I have associated with heliotherapy, which has been established in its turn as a therapeutic factor of three-fold value,—mental, physical and economic.

The Non-Operative Treatment of Tuberculosis Joints of the Lower Extremities. Horace Lo Grasso, M. D., Perrysburg, New York, in Journal of Bone and Joint Surg., xii:4:755, October, 1930.

A patient with a tuberculosis lesion is too often treated by the surgeon as though the only lesion to be considered were the local manifest infection. Often very little if any consideration is given to the fact that tuberculosis is almost invariably a systemic infection regardless of the particular local manifestation or expression which is apparent.

At the J. N. Adam Memorial Hospital we have found over a period of years that sixty-five per cent of the adult patients under treatment for all extrapulmonary

lesions, show a definite though usually inactive pulmonary tuberculosis.

If this is the case, it is reasonable to expect that any merely local treatment of a tuberculosis lesion, beneficial as it may be to that local lesion, may fail entirely to treat successfully the disease itself.

With conservative treatment, not only is metastasis much less likely to occur, but if it does occur, the retention of complete or partial function in one or both joints gives the individual the advantage of the possibility of useful activity.

While the advocates of surgical treatment claim that no permanent cure can be expected in a tuberculous joint if ankylosis is not obtained, on the other hand, the experience of Dr. Rollier and others who have used heliotherapy extensively does not bear out this contention. Besides, nothing is lost by instituting conservative treatment first with recourse to surgery if the conservative treatment fails. On the other hand, what is lost by attempt and failure of surgical treatment is sufficiently evident.

From recent work in various quarters it appears that the maximum effect in both antirachitic action and pigment development in human skin occurs at about 2900 Angstrom units.

At Perrysburg, we have failed to obtain with the ordinary type of artificial lights, clinical results comparable to those obtained with natural sunlight, although a considerable and representative number of so called therapeutic lamps have been tested by us both clinically and in the laboratory.

There have been discharged from the J. N. Adam Memorial Hospital up to January 1, 1930, 437 cases of bone and joint tuberculosis and 72 cases of osteomyelitis, non-tuberculosis in nature, that remained in the institution three months or longer. Their condition on discharge was as follows:

Apparently recovered	53.8 per cent
Arrested	23.1 per cent
Improved	10.7 per cent
Unimproved	7.8 per cent
Dead	4.5 per cent

Tuberculosis is a systemic, not a local disease, irrespective of the particular local manifestations which may be present.

A patient with a tuberculosis joint should be treated for the systemic infection and the joint treated as a complication, not as the primary infection.

Operative procedure is likely to disseminate the disease, especially if undertaken during the acute stage.

If surgery must be resorted to, it should be done only after a preliminary course of conservative treatment so as to bring the resistance of the patient to a maximum.

From the experience of both Dr. Rollier and ourselves, such conservative treatment usually results in healing with useful motion, and retention of that motion without recurrence of the disease.

The Treatment of Throat Conditions with Ultraviolet Light and Silver Nitrate. L. Shillito, M. A., M. B., B. Ch., Chief Assistant, Electrotherapeutic Department, Saint Thomas Hospital, in the Practitioner, cxxv:4:536, October, 1930.

Turning to recent literature on the subject, Cemach has described his method of quartz light irradiation in inflammation of the tonsils, especially in cases of Plaut-Vincent Angina. In obstinate pharyngitis, intensive quartz light irradiation has apparently answered very well. Eidinow, in an article on ultraviolet light in diseases of the nose and throat described his technique of general irradiation combined with local treatment by a water-cooled throat lamp emitting ultraviolet light of sufficient intensity to produce an erythema reaction after 60 seconds exposure of the mucous membrane. Talbot also insists on the importance of realizing that the various pathological conditions in the mouth, for which light treatment is used, are as a rule only part of the general condition and that, therefore, a general irradiation should be combined with local treatment. The wisdom of this will be taken for granted, and only the technique of the local treatment will be described.

In treating the more septic type of pharyngitis and tonsilitis, gingivitis and pyorrhoea, use may be made of the effect of ultraviolet light in producing electrodeposition of silver from a silver solution. The area to be treated is dried, cleaned, and if possible, packed off from the diluting effect of the saliva, and then painted or sprayed with a 1-5 per cent solution of silver nitrate. It is then exposed for three to five minutes to ultraviolet light until a staining effect is observed.

The chief points in favor of using this method in the intra-oral conditions described are that it results in the fixation of the toxins which would otherwise be absorbed, and also the rapid dissociation of the silver solution brought about by the ultraviolet light sets free powerful oxidizing agents in intimate relation with the tissues.

Prognosis and Treatment of Bronchial Asthma, with Special Reference to Pediatrics. Leon Unger, M. D., Chicago, in Illinois Med. J., lviii:4:270, October, 1930.

Prophylactic Treatment.—First of all, heredity is almost certainly a basic factor in the causation of all the allergic conditions. We are justified in advising that intermarriage between allergic patients be frowned upon. Second, in taking histories let us ask our patients whether there is allergy in the family. Third, let us consider each child of an allergic patient as a potential asthma victim, and we can save much suffering, and at the very onset of any of the hypersensitive let us have the child thoroughly examined and the skin tested.

The fourth measure in the prevention of asthma is the further safeguarding of the children of allergic patients. Keep the common excitants away from them as much as possible.

Active Treatment.—The active treatment of bronchial asthma may be divided into specific and non-specific and does not differ very much from that carried on in the adult.

Specific Treatment.—When we find the exciting cause we remove it if possible. Desensitization we believe necessary with some of the exciting materials which cannot be entirely avoided.

Non-specific Treatment.—The non-specific treatment of asthma consists of the use of numerous drugs and different procedures. For the attacks of asthma epinaphrin or adrenalin has stood the test of time and is supreme.

Vaccine treatment is indicated in certain cases where all tests are negative or where true bronchial asthma has been complicated by secondary infection.

For about three years we have been using ultraviolet light as an accessory method of treatment. We believe it helps as a tonic and it seems to be specially valuable in the under-nourished. We believe that it has no specific value, yet our results have certainly been improved since we adopted its use.

We have tried x-ray treatments to the chest and the spleen with no permanent beneficial results.

Dust free rooms can be helpful, especialiy in pollen sensitive cases.

It is highly important, also, that the contributing

factors should be avoided as far as possible,—things like wet feet, over-exertion, excitement, etc. Attention to these will lessen the number and severity of attacks.

Plastic Surgry of the Orbit. A. G. Wilde, M. D., Jackson, Miss., in New Orleans M. & S. J., 83:4:239, October, 1930.

"I am convinced that direct exposure to the sun or ultraviolet light, expedites repair of skin lesions. This may be due to either the local hyperemia produced, or the augmented general resistance of the individual. This exposure should be made at every change of dressings, beginning with ten minutes daily, and increasing in accordance with the patient's tolerance. When healing is sluggish under a bandage, such exposure and drying will often stimulate epithelial proliferation remarkably, especially of the denuded areas from which Thiersch grafts have been removed."

In the discussion on this subject Dr. L. W. Long says that "Ultraviolet rays are of great aid on all plastic work, stimulating the epithelium, helping to cover the area in a short time. Where the lamp is used do not use too much, but where ordinary sunlight is used there is not so much chance for getting into trouble."

Diathermy Treatment of Puerperal Septicaemia and Pneumonia. C. A. Robinson, M. B., in British J. Radiol, iii:32:341, August, 1930. (From the Proceedings of the Royal Society of Medicine.) (Presidential address read before the Electrotherapeutic Section of the Royal Society of Medicine, October 18, 1929.)

Puerperal Septicaemia.—I will now describe twenty-one cases of puerperal septicaemia treated by diathermy at the West Middlesex Hospital.

The method of application is by means of a vaginal electrode and lead belt as used for intrapelvic heating for inflammations of the pelvic contents.

Total cases, 21; formation, 6; recovery by lysis, 8; recovery by crisis, 4; deaths, 3.

The patients who formed the subject of this investigation were all very ill. There can be no doubt that without the intervention of diathermy most of them would have died.

One thing we have learnt is that cases of sapraemia must not be treated by diathermy.

A paper on the technique and results of treating pelvic inflammations in women by diathermy was read before this section in December, 1928 (C. A. Robinson: "Treatment of Pelvic Inflammations by Diathermy", Proc. Roy. Soc. Med., 1929 xxii [Sect. Electro-Therap].

This work on heating infected organs by diathermy satisfies the postulates. The cases are diagnosed and the pathological condition is known with sufficient accuracy to enable them to be properly classified. Notes on the progress are kept and observable physical conditions are recorded. Results have an invariability which is sufficient.

Pneumonia.—Eighty-nine cases of lobar pneumonia have been treated by diathermy at the West Middlesex Hospital, and complete records of these are available.

There is no doubt about the benefit obtained, and this is probably reflected in a lowering of the death rate, though this is difficult to prove.

That the method is considered to be useful is shown by the fact that, beginning with a ward of three beds for men, Dr. Cook has had the facilities for the treatment extended to include that of women, and we now have one of the large wards provided with diathermy for the treatment of men. A team of sister and nurses, especially trained in the application, is employed. The method consists of placing a metal electrode (1 lb. lead), 6 x 8 inches, back and front, with as little disturbance as possible. The current is increased up to tolerance, and is given for twenty minutes every four hours during the day.

TABLE OF RESULTS

Classified	74 cases
Affected by diathermy	26 cases
Unaffected by diathermy	48 cases

In this treatment of pneumonia by diathermy, so far as the specific effects of heating an infected organ are concerned, the postulates are not satisfied. The current applications to the infected areas are not known with sufficient accuracy and the results are variable within the meaning of the postulates. The area of consolidated lung will not always be heated by the current and probably never heated throughout its entire extent.

This does not mean that the method is not useful. It means that the evidence of specific effects of heating the infected organs is unsatisfactory.

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